THE MILBANK MEMORIAL FUND

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PHASES of various public health activities carried on by the State of New York, under the supervision of the State Department of Health, are illustrated in this issue. The photographs are taken from *Public Health in New York State*, the final report of the New York State Health Commission. Many favorable editorial comments about the report have appeared, some of which are reprinted on the pages following 205 ' ' ' The Commission's survey is one of the many projects for public health promotion in the State in which the Milbank Memorial Fund has cooperated.

THE ECONOMICS OF PUBLIC HEALTH AND MEDICAL CARE[1]

by RAY LYMAN WILBUR, M. D.

IT is eminently fitting that a meeting devoted to the economics of public health and medical care should be held under the auspices of the Milbank Memorial Fund. Many of America's great foundations have demonstrated a keen and unwavering interest in medical problems of one sort or another. But few of them, I believe, have been any more interested in the health of the people and particularly in the economic aspects of our present methods for preserving and safeguarding that health than the Milbank Fund. Through its excellent department of research it is adding new knowledge to our present precious store, and it is criticizing and analyzing the progress of public health work to make sure that this work is directed toward important problems and rests on sound bases.

It was in considerable part through the timely and generous support of the Milbank Memorial Fund that the Committee on the Costs of Medical Care was able to start its five-year program of research in an endeavor to formulate a plan for providing adequate, scientific medical service to all the people, rich and poor, at a cost which can be reasonably met by them in their respective stations in life. The Fund was quick to recognize the significance and the desirability of carrying forward the Committee's program, and we of the Committee have always felt we could obtain not only financial support but also intelligent cooperation and valuable advice at 49 Wall Street. What is perhaps more important, we knew we didn't have to follow the advice given.

[1]Dr. Wilbur's address was given at the tenth annual dinner meeting of the Boards of Counsel of the Milbank Memorial Fund, March 17, 1932.

Tonight I wish to address you not only as chairman of the Committee on the Costs of Medical Care but also as a physician, fallen from grace, if you will, but a physician nevertheless. Let us speculate a little about the future development of medicine and public health in the United States.

MEDICINE AND GOVERNMENT

To do so, we ought to review briefly the temper of the American people toward medical service and particularly their attitude toward governmental activity in this field. Governments were originally organized to carry on war and expedite commerce. Education was for the favored few and skilled medical care was a prerogative of the Crown. The rest of the populace found such consolation as it could in the ministrations of midwives, bone-setters, and barber-surgeons. With the expansion of economic well-being and the concomitant increase in power, however, there came a demand from the lower classes for more education and more medical service. Bismark felt the force of this demand. Anxious to appease the populace so that he might win support on issues closer to his heart, he instituted a system of sickness insurance and made it compulsory for the lower income groups by government edict. Although it is true that the German government makes no financial contribution to the insurance and probably does not supervise it any more closely than our American states supervise life insurance companies, nevertheless this action has had a profound psychological effect both in Germany and in other countries in Europe. Most of them have now adopted some form of governmentally-supervised sickness insurance, voluntary in a few instances and compulsory in the remainder, and the people now look to their central governments to protect them against the hazards of sickness.

AMERICA'S UNIQUE OPPORTUNITY

In the United States our history has been somewhat different. When the war for independence was concluded, the thirteen isolated colonies found themselves faced with the task of forming a common government for peace time. Each colony was independent, sovereign, and jealous of its own rights. So hostile to a strong central government had the colonies been that they had on many occasions seriously hampered the prosecution of the war and only the genius of a relatively few brilliant and faithful men saved the struggle from utter collapse. When peace was secured, the colonies framed Articles of Confederation which left each state practically undisturbed in the exercise of its powers. With the adoption of the Constitution and its expansion by Chief Justice Marshall, a far stronger central government was established; there has ever since been a struggle between the forces of centralization and the forces for local home rule. The success of the North in the Civil War again strengthened the hand of the central government, and the subsequent rapid development of the country and growth of interstate activity have further increased its power.

In spite of the vast concentrations of power and authority now in Washington and the growing and dangerous tendency of the people to turn to the Capitol for all necessary reforms, we have retained in America a healthy local responsibility and control over two important functions—education and medical service. Insofar as these functions are supported by taxes, the funds are assessed, collected, and disbursed locally. The Federal Government has never attempted to control or to finance education, except insofar as advisory and consultant services have been made available on request of local officials. Likewise in the field of public health and medical service, until the Veterans' Bureau was established, the Fed-

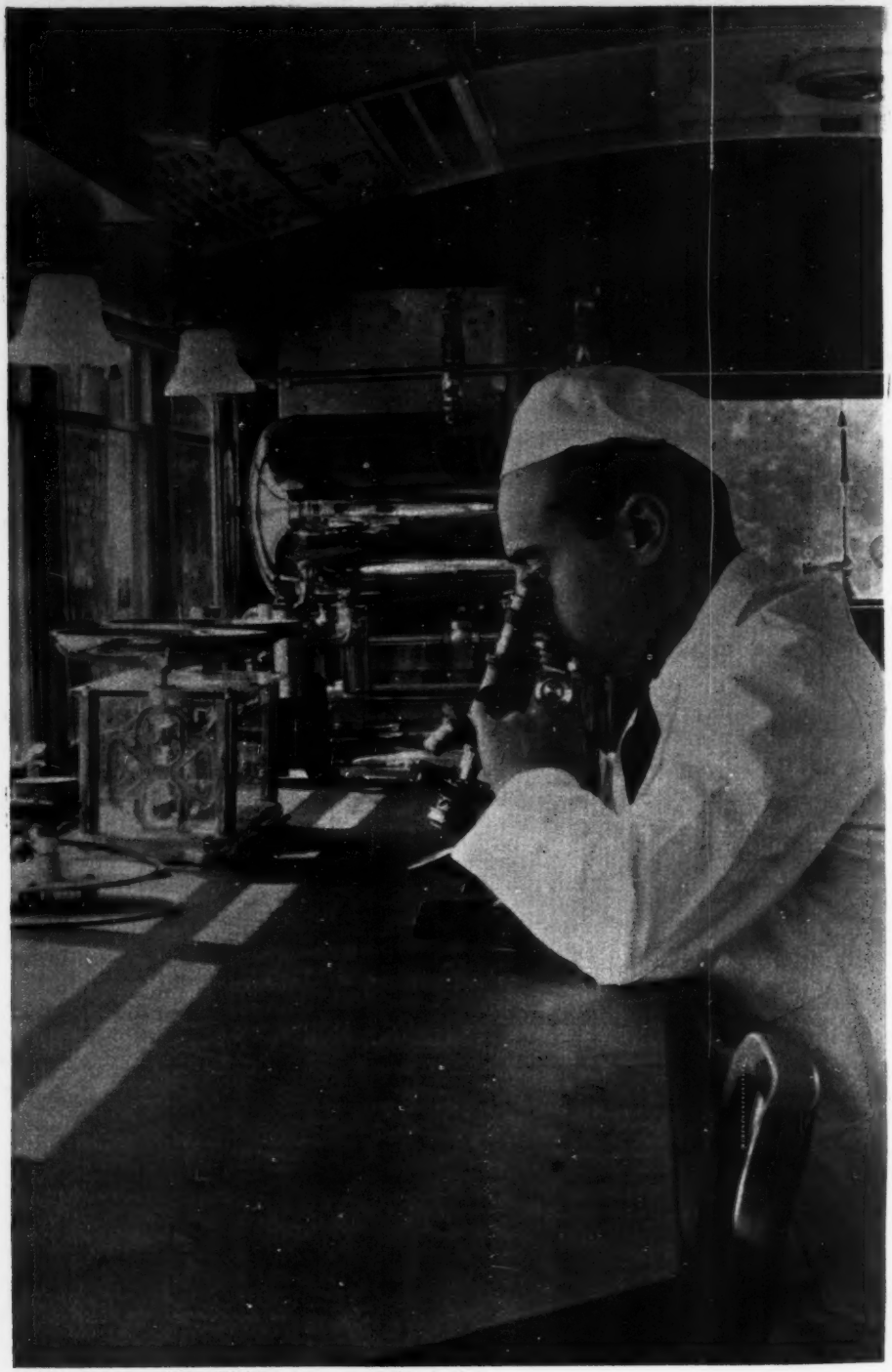
eral Government confined itself largely to those few services, such as quarantine, the care of lepers, and of army, navy, and merchant marine personnel, which obviously could not be done with even minimum efficiency by the individual states.

As a result we have in this country a unique opportunity. With no central authority attempting to force uniformity of action on all parts of the country, we can try out a great variety of plans. If state action is necessary, we have forty-eight laboratories in which to find out what action is most effective; if city or county action is called for, we have several thousand "experiment stations." We have no tradition that impels us to consider health matters as a federal concern. We have no need ever of tying ourselves hard and fast to any one type of proposal. This freedom, this opportunity for diametrically opposed types of experimentation, this chance to blend various factors in various ways to obtain a new result is a distinctive New World advantage.

Of what service is this unique opportunity, when we are considering the economics of public health and medical care? To answer that question we must first determine what are the problems in medicine which merit our attention. Why is it that both medical and lay periodicals abound with discussions of one aspect or another of the provision of medical service? Why has the Committee on the Costs of Medical Care devoted five years and nearly a million dollars to finding out the facts about the present provision of medical service in the United States and possible ways of improving it? Why has the Committee's work aroused such a widespread popular interest? These are fair questions. Let us examine the problems involved.

When one first begins to study the economics of medical care in the United States, he feels himself a Hercules battling the Hydra. Everywhere he looks a new problem appears.

A typical water purification plant in Monroe County, New York



Interior view of one of the mobile laboratories maintained by the New York State Laboratories for the inspection of milk and cream supplies

If, however, he can secure a truce in the battle long enough to analyze these problems, he will probably realize that the Hydra's heads arise from two main trunks.

ADVANCES IN MEDICINE

The first of these two major problems is the provision of adequate, modern, scientific medical service to the people. It is true that during the last century we have made remarkable advances in medicine. Smallpox, which as late as the middle of the eighteenth century was, according to one English physician, "the terror and destroyer of the greater part of mankind," now causes less than 0.1 death per 100,000 yearly; and its virtual eradication awaits only the more widespread use of vaccination. From 1800 to 1879, every year witnessed an outbreak of yellow fever in the United States. Today yellow fever is not even listed as a "principal cause of death" by the Bureau of the Census. Typhoid fever now causes only 6.8 deaths per 100,000 population annually, yet a few years ago it was one of the major communicable diseases. Some communities in the South have recently been economically and socially transformed by the partial elimination, due to scientific treatment, of hookworm disease and malaria. The children of the future, if properly safeguarded by antitoxin and toxin-antitoxin, should be practically freed from the dreaded diphtheria. Recent discoveries promise greater freedom from scarlet fever. Preventives have been found for gonorrheal ophthalmia, and progress has been made in the control of pellagra, endemic goiter, and diabetes. To modern scientific measures the United States owes its freedom from cholera, typhus, and bubonic plague.

From 1880 to 1930 the general death rate in the United States dropped from 19.8 to 11.3 per 1,000, and there was a corresponding increase in the expectancy of life.

Our care of the sick has grown on ancient forms of magic, empiricism, and faith. The profession of medicine has built on these and has far transcended its early historical antecedents. Discovery after discovery has been brought into everyday use. The hospital has been given a new and indispensable place in human society. The trained nurse has become a fixture in our medical service. The possibility of widespread preventive programs is now generally recognized. Research on a multitude of subjects is going forward in universities, in clinics, in commercial organizations, and in the private offices of practitioners. The literature of medicine is copious and stimulating. Professional societies throughout the land devote a considerable part of their funds and even more of their time to the educational advancement of their own members. As a profession we have just cause for pride in our accomplishments.

NEED FOR WIDER DISTRIBUTION OF BENEFITS

Measured by what is possible, however, in the light of present medical knowledge and technology, much remains undone. "We know infinitely more than we do." Many of our people are untouched by the possibilities of preventive medicine. Some of them, we must admit, receive only second-rate care when ill and others are entirely without scientific care. In a recent survey, 35 per cent of the cases of illness, excluding colds and other minor digestive disturbances, were not seen by a physician. Untrained, ignorant, and superstitious midwives bring nearly 15 per cent of our future citizens into this world each year. Few of us enjoy the benefits of a complete annual physical examination. We have seen the tremendous growth in the number of dentists in our country and in the quality of the services which they render; yet from 80 to 90 per cent of school children on examination

by dentists are found to have carious teeth. Only one-third of the American people, if those in Vermont and in San Joaquin County, California, are representative samples, receive any dental attention whatsoever during a year. Physical defects which could be corrected nevertheless persist and lay their toll of inefficiency and discomfort on the people.

Nurses we have in such abundance that unemployment constitutes one of their major problems; yet there are many people who need skilled or semiskilled nursing who cannot afford to purchase it. In rural districts there is still a paucity of hospitals and, increasingly, a lack of physicians' services immediately available. (Of course the extension of good roads and telephones has an important bearing on this last problem.) Some of our doctors are working today with the education given them thirty years ago. They are antiques that need repolishing. Our facilities for postgraduate work are still inadequate. In view of the opportunities we possess for developing the highest type of postgraduate instruction, our present offerings seem feeble indeed. Even if they were adequate, however, we should have to find a method whereby the doctor could leave his practice for one to six months and, on his return, find it still waiting for him.

Because medicine is so highly individualized it is, from the point of view of society, wasteful. Patients frequently spend much time going from one physician's office to another before they receive the necessary examinations or treatments. This is especially true if the disorder is obscure and difficult to diagnose. Sometimes the advice of different specialists conflicts and the patient doesn't realize that his greatest need is for a sane, well-trained general practitioner. Frequently examinations are repeated within a brief time. Over a period of years various physicians may have extensive records of a particular patient, records which duplicate each

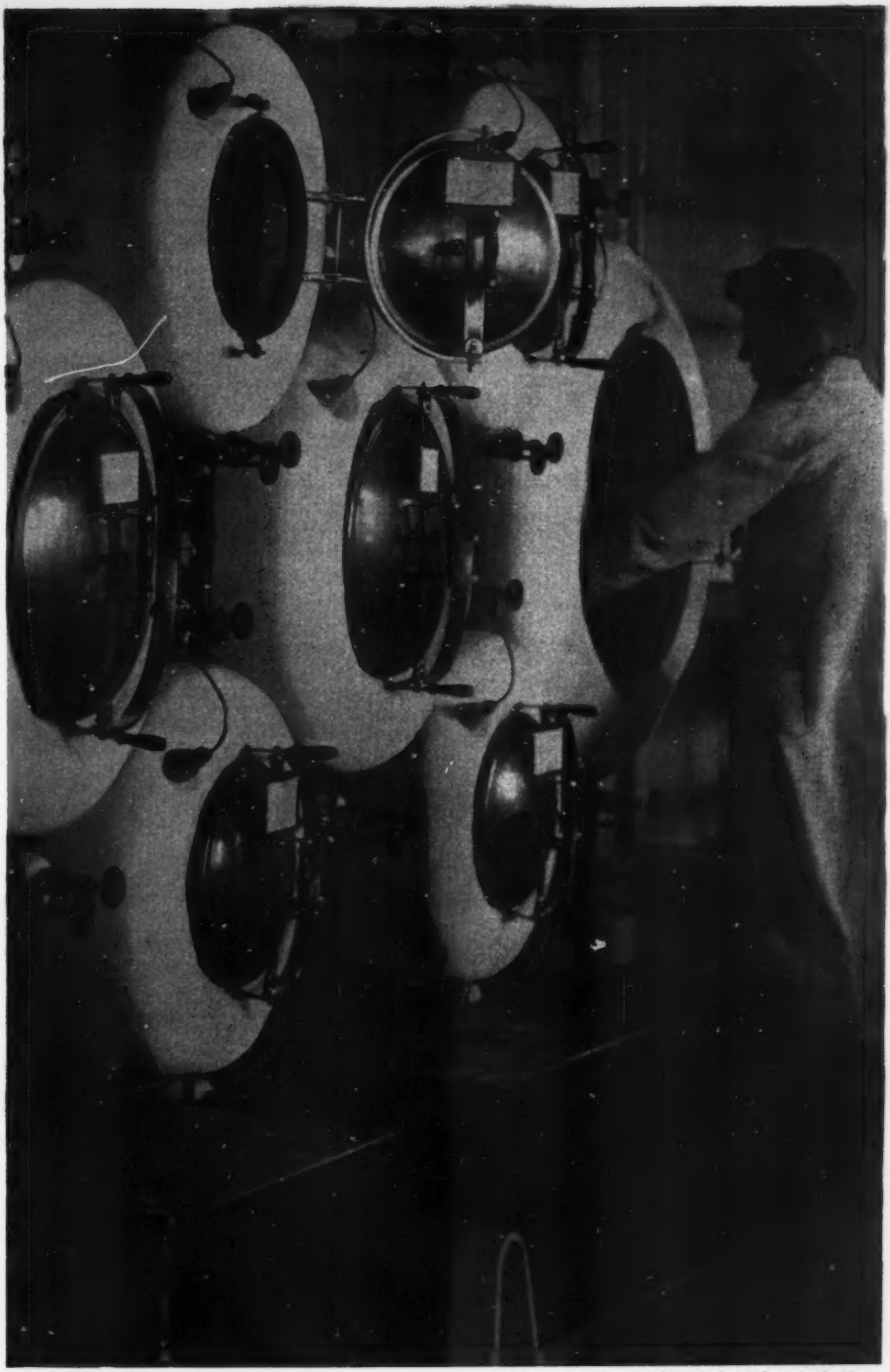
other in part but none of which is complete. Sometimes, although there may be several physicians engaged on a single case, instruction regarding minor but important details are not given to the patient.

The evidence is conclusive that our people do not yet receive all of the benefits that they could from modern medicine. For the rich and the near-rich there is no real problem since they can command the very best that science has to offer. The indigent and the near-indigent are usually, although by no means universally, given a good grade of service by their local governments. Among the majority of the population, however, there are great islands of untreated or partially treated cases—patients who receive a larger or smaller part of the benefits of present-day skill but who cannot partake fully of the feast before their eyes. Although it is a principle of far-reaching and, perhaps, of revolutionary significance, I think there are few who would deny that our ultimate objective should be to make these benefits available in full measure to all of the people. We reach in that direction today, but we still fall short.

THE PAYMENT OF MEDICAL COSTS

The second aspect of the problem is the payment for medical service. Obviously the provision of service and the payment for it are interrelated. But for convenience of discussion we can profitably separate them. Some data recently made available indicate, in part at least, the nature of the problem from the patient's point of view.

Among 4,560 families who kept records of their total medical charges during a year, we found a wide range of charges per family. There were 1,788 of these families whose total annual incomes for the year were under $2,000 per family. Forty per cent of these low income families incurred medical



A battery of autoclaves in the New York State Laboratories

A serological laboratory in the New York State Laboratories

costs for the entire family of less than $25 for the year, 20 per cent had charges from $25 to $50, 21 per cent from $50 to $100, 14 per cent $100 to $250, 4 per cent $250 to $500, 1 per cent $500 to $1,000, and 0.2 of 1 per cent $1,000 to $2,500. Eighty-one per cent of this group had bills of less than $100 for the year and, we may assume, could pay their medical charges without serious hardship, but the remaining 19 per cent must impair their living standards, draw on savings, or borrow money if they are to meet their expenses. The 81 per cent paid only 36 per cent of the total bill of the entire group, while the 19 per cent were faced with 64 per cent of the amount, making the average per family eight times as high in the latter group. Among the higher income groups, the situation is roughly similar. In any particular year most families have moderate medical expenses in view of their total incomes, while a few families, perhaps 20 per cent of the total, are taxed beyond their means. Next year, fortunately, a somewhat different group of families will constitute the 20 per cent.

The essential fact is that medical charges fall with great unevenness on different families during any given year and on the same family during the course of several years.

SIZE OF PROFESSIONAL INCOMES

No well-informed student of medical economics believes for a moment that the patient's difficulty in paying medical costs is primarily or basically due to excessive fees on the part of physicians and other practitioners. There are a few "gougers" in medicine, of course, just as there are in all walks of life, but any impartial analysis of the incomes of physicians leads to the conclusion that in view of the time devoted to training and education, and the responsibilities assumed, there is no general overpayment of practitioners.

Let me give you a few facts about professional incomes. The seventy-nine practicing physicians in San Joaquin County, California, had a median net income in 1929 of $5,500; in Philadelphia 245 representative physicians reported net incomes for 1928 for which the median was $4,200; 137 Vermont practitioners reported net incomes for 1929 with a median of $3,400; and thirty physicians in Shelby County, Indiana, had a median income in 1928 of $3,100. Some unpublished data regarding physicians south of the Mason-Dixon line indicate that conditions in certain large areas of the South are such that large numbers of physicians in 1930 received net incomes of less than $1,000. On the average the general practitioners reporting have net incomes about half as large as the specialists. Dentists in twenty states reported median net incomes for 1929 of $4,000.

Most of these figures are for 1928 or 1929. In 1930 physicians' incomes fell off appreciably, and last year and this year the situation is doubtless even worse. In fact, one of the most significant aspects of the practice of medicine in the United States is the financial precariousness and insecurity of the major practitioners concerned.

WHY IS PAYMENT A PROBLEM?

It is obvious that we cannot assume that the payment problem arises primarily because physicians receive incomes that are too large. Its roots go deeper than that. It rests on two principal bases: first, the physiological nature of the human structure, and the resulting uncertainty, so far as the individual is concerned, of the time, and the place, and the nature of the illness or illnesses which will affect him; and second, the uneven distribution of wealth in the United States and the apparent inability of a considerable number of people to do more than meet their current expenses. We

feel reasonably confident when we say with Hermann Biggs, "*Public* health is purchasable." Our experience has been that if we perform certain tasks faithfully and conscientiously our mortality and morbidity rates will fall. But to the *individual*, we must be much more guarded in our promises. We may assure him that he can avoid diphtheria and smallpox and probably typhoid fever and certain other diseases. We can point out the benefits of sane, wise living, of reasonable exercise, of adequate rest, and of proper diet. We can suggest an annual physical examination. Yet, although the individual may faithfully follow our advice, we can not assure him that he will escape all expensive illness. For the *group* we can now predict with a fair degree of certainty the incidence, duration, and severity of the illnesses which they will have; for the *individual* definite prophecy is impossible.

In the light of this uncertainty it is easy to discern the psychological barrier to saving money in anticipation of an uncertain attack of illness which, if it comes, will cost an unpredictable amount. Even if a family does save, it has no way of assuring itself that the saving will be adequate.

But the uncertainty and the resulting adverse psychology are not the only obstacles. We must also face the fact that we distribute the fruits of our economic harvest in such a way that numerically important sections of our people have little surplus after paying even minimal amounts for food, clothing, and shelter. In 1926, according to a careful estimate, 32 per cent of the families here in New York received annual incomes of less than $2,000 per family and 48 per cent received less than $2,500 per family. In a large majority of cases this income represents the earnings of more than one member of the family. Most of these people can pay something for medical service and, if fully employed, they are able to pay their medical expenses during times of normally

good health. But a serious illness involving hospitalization and special nursing as well as the services of one or more physicians quickly bankrupts them.

Paradoxically enough the problem has been sharpened by the very advances in medicine on which we pride ourselves. As automobiles have improved in quality, they have been more widely sold, and, as a result, have decreased in cost. But the greatest danger an economist runs in probing the economics of medicine is that he will expect to apply the automobile techniques and criteria and will not realize the deep significance of the difference between a personal, professional service and an impersonal, manufacturing or commercial process. In medicine as our methods of measurement, of observations, and of treatment have grown in objectivity and precision, they have of necessity in many cases become more, rather than less, costly. The saddle-bag day of medicine has passed and the new era has brought us new problems. We cannot disregard modern methods. Although we all realize that complicated laboratory equipment is no substitute for the careful, thorough attention of a skilled mind, we also realize that if we are to practice medicine scientifically, if we are to do our best for each patient, we must have available many expensive tools and must utilize many procedures that were unknown to our grandfathers. Good medicine today has to be more costly than the good medicine of even twenty-five years ago.

HOW SHALL WE PAY?

Granted that good medicine is costly, I don't see how we can avoid paying the price. If we organize our talent for producing medical services economically and efficiently, a task well within the scope of America's peculiar genius, if we give thought to our navigating problems and plan our

course to take fullest advantage of the wind, the waves, and the strength and speed of our ship, we shall undoubtedly find that the cost is not too great for our present society. For inadequate medical services, produced with all the wastes inherent in individualized practice, we now pay about $30 per capita annually. With organized, coordinated effort we should be able to provide ample medical services of good quality to all the people and with proper remuneration to the professional personnel for a cost of somewhere between $20 and $50 per capita per year. (I am purposely leaving a wide latitude in this figure. At the present time I don't pretend to know or particularly care what the precise figure is. The Committee on the Costs of Medical Care is carrying on some studies of organized medical services in industrial, university, and military groups which will enable us to make very close estimates under various given conditions.)

Whatever the figure may be, the real nub of the economic problem is to determine whether the cost of good comprehensive medical care is within the reach of our people. If all but the indigent can pay the price, we merely face the technical task of devising suitable methods of collecting the charges. Undoubtedly in cooperation with our industrial, fraternal, insurance, church, trade union, school, agricultural, or other existing organizations we can find or devise inexpensive and efficient collection methods. That is a problem for the technician.

On the other hand, if we find that there are substantial groups of our people who, though not indigent, nevertheless have so little surplus over the bare essentials of life that they cannot reasonably be expected to pay the cost of decent medical service, economically provided, we face a different and somewhat more vexing problem. Our sympathy, our sense of "fair play," and our desire for self-protection and

self-preservation all unite in demanding that we reject emphatically any suggestion that these people should be given an inferior service—a service that we cannot label "good in quality and reasonably adequate in quantity." If we expect charity to meet the cost, we are faced with the fact that charity, when obviously labeled as such, is distasteful to self-respecting people and is too erratic and inadequate to meet such a large national problem. May we, in such cases, turn to the local and, perhaps the state government, and expect that it will meet a sufficient share of the cost to bring the charge to individual families within their reach? May we expect that local officials will agree that the protection of the people's health is as important, although not as costly, a social responsibility as the education of their minds? May we assume that methods can be worked out that will enable the local government to help carry the financial burden without placing the *morte main* of official red tape or politics on scientific progress and skilled service?

WHITHER ARE WE MOVING?

Today there are many trends in medical practice some of which move along the lines we have been suggesting. All of them indicate attempts of one kind or another to surmount some of the difficulties in present-day medical economics. In the first place, medicine is increasingly being regarded as a cooperative enterprise. The Lindbergh type of practice is inevitably yielding to the Admiral Byrd type. More and more, physicians are practicing in hospitals, where they not only have better facilities than they could provide as individuals, but where they have a constant contact with professional colleagues. Clinics and dispensaries have increased prodigiously and the practice of medicine is affected by their extension. Most of them are organized as charitable

or semicharitable institutions and restrict their clientele in one way or another. The advantages of group association, however, are so patent that private group clinics are developing independent of any charitable tradition. A few of these private group clinics, moreover, are actually located in hospitals, and most of them are closely connected with one or more hospitals. In the larger cities physicians and dentists are concentrating their offices in particular buildings, so that they can more effectively work together.

There is manifest an increasing public feeling that the health of the community is a major concern of local and state governments. In addition to the traditional services in connection with sanitation, communicable disease control, and vital statistics, departments of public health (in cooperation frequently with departments of education) are supervising the health of school children, even, if necessary, to the extent of correcting their physical defects, are operating maternal and infant welfare clinics, are providing tuberculosis clinics, sanitoria and preventoria, are offering laboratory services to private physicians, are giving dental treatment, particularly to children, and are treating cases of venereal disease and cancer. At least one health department is considering seriously the necessity of assuming a larger responsibility for the care of chronic cases of all kinds, especially those like arthritis which are expensive to treat. Others are supplementing and strengthening the services provided for the indigent. Some municipalities have built general hospitals to which they admit the nonindigent as well as the indigent.

Universities, standing as they do *in loco parentis*, have in many instances provided systematically for the health of their students. There has been a substantial growth of such work since the war, and on January 1, 1931, there were 153 colleges or universities with organized, student health services.

The industries of America are evincing a decided interest in the health of their employees. In Philadelphia, in 1929, at least three-quarters of a million dollars was spent by 102 industrial plants in carrying on various kinds of health work for their employees. A large part of this work consisted of examinations of applicants for positions or periodical examinations for placement or transfer. Most of the plants had only part-time service, and some of them only first-aid workers. In a large majority of these Philadelphia plants the medical service is given only in the plant itself. Some industries, however, are providing medical service that goes far beyond the simple examination of employees and treatment of accidents. At the Endicott Johnson plant in New York State a fairly well-rounded service, including medicine, dentistry, nursing, hospitalization, and the provision of drugs, is provided to the 15,000 workers and their families. No charge is made to the employees for this service, and in 1928 it cost the company $25 per capita for those persons in families that used the service. In the railroad, mining, and lumbering industries, particularly in the South and Far West, the old company doctor has frequently given way to an organized, coordinated medical service which is rendered to employees at a monthly charge. In some instances, the employee's dependents are eligible.

The provision of medical care on a monthly fee or contract basis has been offered by a number of private group clinics. One clinic in Los Angeles has contracted with several employee groups (totaling about 7,500 families) to provide practically complete medical service for $2.00 per person per month. With the exception of dentistry and home nursing, practically all medical services are included.

The Baylor University Hospital in Dallas, Texas, is selling a form of hospital insurance to school teachers and other

groups for approximately 50 cents a month. In Grinnell, Iowa, the local hospital offers hospital insurance for $8.00 per year. In Vermont, the Brattleboro Mutual Aid Association offers two types of insurance to citizens of that community. Insured patients needing hospital surgery pay the first $30.00 of their expenses and then are reimbursed for all expenses including the surgeon's fee thereafter up to a maximum of $300. Patients needing nursing service obtain it at one-third or one-half of the usual fee.

It would be easy to multiply instances of outstanding experiments. These are just a few samples. The important thing is to realize that a tremendous ferment is working in our medical system. Both doctors and laymen are reaching out in various directions to find methods of leveling the cost of medical service and of providing a better quality of care than has previously been available. Where this evolution will take us, we know not. That it contains dangerous as well as hopeful possibilities is apparent.

CONCLUSION

In summary then I think we can agree that our present methods of providing and paying for medical service are unsatisfactory on four different grounds: First and most important, all the people do not obtain all the care which they really need, either quantitatively or qualitatively. Second, the cost is unevenly distributed among the people, causing hardship to some while others pay little or nothing, and this unevenness is of such a character that families of moderate means or of low incomes cannot fully overcome its effects merely by individual family budgeting. Third, the incomes of practitioners are frequently so uncertain, irregular, and low as to constitute a grave problem—a problem with social as well as individual consequences. Finally, our present

methods of providing and paying for medical service are, from the social point of view, wasteful and uneconomic.

For four years the Committee on the Costs of Medical Care has been working to analyze these problems, to define their magnitude, and to search for constructive and practicable suggestions for improvement. Next fall we expect to present to you a final report with our recommendations.

When our report is published, our staff discharged, and our Committee disbanded, the responsibility will fall on other shoulders. The Committee can, after all, only blaze a trail. Whether the five years' intensive labor and the million dollars which it has cost are actually to stimulate a better provision of medical service in the United States depends upon the degree to which the professions and the public are willing to assume their responsibilities. No edict from Washington will ever settle these problems. They will only be settled when and to the degree that physicians, dentists, public health officers, educators, industrialists, labor leaders, civic workers, hospital trustees and executives, and other persons in positions of authority and influence understand and accept their own individual responsibilities.

The present temper of our people favors social experimentation and adventure. The lure of the untried is strong. If we can capitalize this attitude, if we can give honest and intelligent leadership to the forces of social discontent, if we can act with courage and vigor at the right moment, we will, I am convinced, be able to inaugurate various improved methods of providing medical care to the American people. We neither desire nor expect a mushroom growth but we do wish to make available as rapidly as possible more adequate medical service to a larger number of our people. No other course of action holds greater promise of enriching American life and benefiting every phase of our national welfare.

CHANGES SINCE 1900 IN THE FERTILITY OF NATIVE WHITE WIVES

by WALTER F. WILLCOX[1]

THE nineteenth century has been called the statistical century and also the century of democracy. The two developments are interrelated, for democracy is a form of government through public opinion, and public opinion is ascertained by elections which are essentially statistical processes, "counting heads so as to save breaking them."

No statistical development of the last half century has been more important than the growth in methods of sampling. The introduction of these methods has widened the field of statistics almost without limit. Wage statistics, unemployment statistics, and cost of living statistics are regularly thus obtained. As not all persons entitled to vote do so, an election also is a sampling process.

The sampling method has great advantages and also great dangers. It can be used in many fields where the method of complete enumeration is impossible; where the two overlap, the sampling method is far cheaper than the census method; the former makes it possible to isolate a problem as we cannot in a census or in politics. To isolate a problem is an essential characteristic of modern science to which many of its triumphs have been due. While statistical methods have been developing with steadily growing success, the progress of democracy has been checked and many of its advocates are discouraged. Is not this due in part to the failure of democracy to adopt the later statistical methods?

In my judgment, the largest contribution of the Division

[1]Dr. Willcox is professor emeritus of economics and statistics at Cornell University, and has been for a generation connected in various ways with the Bureau of the Census.

of Research of the Milbank Memorial Fund is that it is using the sampling method and the method of isolating a problem with the care and the precautions characteristic of modern science. By thus avoiding or reducing the dangers inherent in the sampling method, it is contributing to the elucidation of American population problems.

But one further precaution should be taken. The sampling method and the Government's method of complete enumeration by a census or by registration are as intimately related in statistical procedure as the right and left hands are in manual labor. Both the trustworthiness and the significance of the results obtained by either are heightened when compared with those of the other. This conviction, a result of long experience mainly with governmental work, has been brought home to me by reading Mr. Sydenstricker's paper in the January issue of the Milbank Memorial Fund's *Quarterly Bulletin.*[2] The following comments on that paper aim primarily to show how in a specific case the results of complete enumeration gain definiteness and significance from being set as a groundwork behind results from the sampling method, and how the latter also gain by being placed against figures from a complete enumeration.

In the study I have mentioned, the fertility records in a population group of about 5,000 living in five rural townships in Cattaraugus County, New York, are analyzed. This is a sample population probably typical of that in many adjacent rural districts. From this group 1,036 fertility records were obtained, including one from every native woman who had been married only once and had not separated from her husband before her forty-fifth birthday. Near the end of the

[2]Sydenstricker, Edgar: A Study of the Fertility of Native White Women in a Rural Area of Western New York. Milbank Memorial Fund *Quarterly Bulletin*, January, 1932, x, pp. 17-32.

paper these records for 1929-1930 are compared with corresponding census records of the native-white farmers' wives living on Cattaraugus County farms in 1900 and 1910. The conclusion is drawn that there had been no significant downward trend in the fertility of such wives, and the suggestion made that the fertility of the stock under a stable environment had not greatly changed.

When I first read this conclusion and suggestion they seemed to me improbable. To show the frame of mind in which I approached them, may I recall that the trend of fertility on both sides of the Atlantic has long been downward, that the rate of decrease has varied widely but that there is little evidence of a stationary or increasing fertility in any considerable area or any large class of population, and that the downward trend has been especially marked in the native-American stock of the northeastern states? The presumption against finding an exception among the farmers of Cattaraugus County I thought was strong, the group of farmers' wives was small, and the question whether records obtained in about one-seventh of the townships of Cattaraugus County were comparable with sample census records of farmers' wives obtained twenty or thirty years earlier throughout the County had not been examined.

A few words are needed about the relation between the method of sampling and the method of complete enumeration. The two start into a problem from opposite ends and proceed towards each other in the effort to see how near they can get. If I had sought to learn what light census data can throw upon changes in the fertility of farmers' wives in Cattaraugus County since 1900, I would have started with the trend of fertility in the United States first among all women and then among white women. The next step would have been to study the trend in New York State.

The best available measure of fertility for the United States and for New York State during the present century is the proportion of children under five years of age to married women of childbearing age at successive censuses. Other evidence shows that the fertility of women in the United States was at its height in 1810 and has been decreasing for 120 years with the exception of one period between 1850 and 1860.[3] The fertility of white women in New York State has been similarly measured for a century, 1830-1930. In 1830 there were 700 white children and in 1930, 278 to 1,000 white women 15-49 years of age; in other words, the fertility of white women in New York has fallen by three-fifths in the century just ended.

But the period covered by Mr. Sydenstricker's figures is limited to the last thirty years during which in two respects the census material is better. Beginning with 1850 figures are available for native whites,[4] and beginning with 1890 for married native whites. In New York State the fertility of native-white married women 15 to 44 years of age, as thus roughly measured, fell between 1900 and 1930 by about 20 per cent.

The paper I am reviewing suggests that the birth rate may have remained about stationary in rural communities with a stable environment. For the United States, 1920-1930, the only period for which the evidence is obtainable, there seems to have been no difference between the fall of the birth rate in urban and in rural districts. The number of native-white children to 1,000 white women 15-44 years of age fell in

[3]Willcox, Walter F.: The Change in the Proportion of Children in the United States and in the Birth Rate in France during the Nineteenth Century. *Publications of the American Statistical Association*, New Series, March, 1911, xii, No. 93, pp. 490-499.

[4]Found by computing the number of native-white children born of native parents and under 5 years of age to 1,000 native-white women 15-44 years of age.

American cities by 75 per 1,000 and in the rural districts by 76 per 1,000. But in New York State there was a marked difference. In New York cities the proportion of children fell by 90 per 1,000, in the rural districts by only 39 per 1,000. On dividing the population of the rural districts into the population on farms and the population off farms, the fall in the proportion of children off the farms was 43 per 1,000 and on the farms only 17 per 1,000. Thus, while the proportion of white children in the rural districts of the United States fell nearly 8 per cent, that proportion on the farms of New York State fell less than 2 per cent.

We are now almost as near to Mr. Sydenstricker's problem as the census figures will carry us, and thus far no exception has been found to the uniform rule that the birth rate fell between 1900 and 1930. These facts led me to look at his results with skepticism, not merely in its etymological meaning of a suspense of judgment, but also in its current meaning.

Before adopting that attitude, however, there is one more step which the census figures permit us to take, a step which might never have been taken but for the incentive furnished by the surprising results before us. Mr. Sydenstricker has studied a rural population, and the tendency in rural fertility may differ from the average. Unfortunately, as we have seen, there is no direct measure of rural fertility in the United States or in New York State for longer than the last decade.

If the trend of rural fertility, however, 1900-1930, differs from the trend of urban fertility, that fact might be reflected in a difference in trend between the states predominantly rural and the states predominantly urban. To test this the trend among the native-white married women in Mississippi was examined, that state being chosen because Mississippi has a proportion of its population (74 per cent) living outside of incorporated places larger than that of any other state.

Table 1. Children under five years of age of native-white parents per 1,000 native-white married women 15-44 years of age in 1900 and 1930, with the change between those dates, for each state and the United States.

Area	Children under 5 Years of Age Per 1,000 Married Women 15-44 Years of Age		Change between 1900 and 1930
	1900	1930	
Continental United States	790	596	— 194
North Dakota	631	720	+ 89
New Hampshire	502	577	+ 75
Vermont	605	651	+ 46
Maine	602	642	+ 40
Massachusetts	492	523	+ 31
Rhode Island	485	508	+ 23
Michigan	545	567	+ 22
Minnesota	638	630	— 8
Montana	598	572	— 26
South Dakota	714	683	— 31
Colorado	597	557	— 40
Wisconsin	674	629	— 45
Connecticut	519	473	— 46
New Mexico	911	800	— 111
New York	553	441	— 112
Nebraska	749	628	— 121
Iowa	751	619	— 132
Ohio	692	554	— 138
Nevada	608	467	— 141
New Jersey	599	454	— 145
California	517	372	— 145
Utah	957	806	— 151
Indiana	746	593	— 153
Pennsylvania	760	598	— 162
Arizona	711	543	— 168
Washington	618	449	— 169
Idaho	870	699	— 171
Wyoming	761	586	— 175
Kansas	794	616	— 178
Illinois	676	493	— 183
Dist. of Columbia	575	388	— 187
Delaware	728	522	— 206
Kentucky	1,020	807	— 213
Oregon	669	452	— 217
Maryland	819	585	— 234
Missouri	830	568	— 262
West Virginia	1,115	840	— 275
Tennessee	1,065	759	— 306
Oklahoma	1,010	683	— 327
South Carolina	1,145	811	— 334
Arkansas	1,103	767	— 336
Virginia	1,099	762	— 337
Alabama	1,161	815	— 346
North Carolina	1,220	866	— 354
Georgia	1,122	746	— 376
Florida	1,009	617	— 392
Mississippi	1,189	791	— 398
Louisiana	1,140	722	— 418
Texas	1,066	612	— 454

Among white women in Mississippi as in the United States and in New York the trend of fertility between 1900 and 1930 was downward and at a rate much above the average.

Not satisfied with that result, I arranged the states according to their proportion of rural population or population living outside of incorporated

places having at least 2,500 inhabitants. For present purposes that is a better definition of rural than throwing all incorporated places into the urban class, because the 5,000 people studied in Cattaraugus County included one village of about 1,000 inhabitants. When the new definition of rural population was adopted Mississippi took second place after North Dakota.

Much to my surprise, the trend of fertility of native-white wives in North Dakota since 1900 was found to be upward. With that as a clue, the trend in the other states was examined, whereupon it appeared that in Michigan and in five New England states, all but Connecticut, as well as in North Dakota, the trend of fertility of native-white wives of childbearing age since 1900 has been upward. (Table 1.) There are thus seven states near the northern border of the country in which the fertility of native-white women has increased counter to the general trend.

The ratios show, also, that the country is roughly divisible into belts by east and west lines, as illustrated by Figure 1. The most rapid decrease in the fertility of native-white wives between 1900 and 1930 has been in the states of the Far South. In Florida, Mississippi, Louisiana, and Texas it was more than double the average. North of these states lies a group including all the other divisions south of Mason and Dixon's line and the Ohio River, except the District of Columbia, and including also Missouri and Oklahoma, in which the decrease has been faster than the average but not twice as fast. Washington is the only state at a distance from this group of which the same is true. In all states of the North and West except Washington and the seven in which there was an increase, the decrease has been less rapid than the average.

Figure 2 shows that the states in which the fertility of native-white wives either increased or decreased more slowly

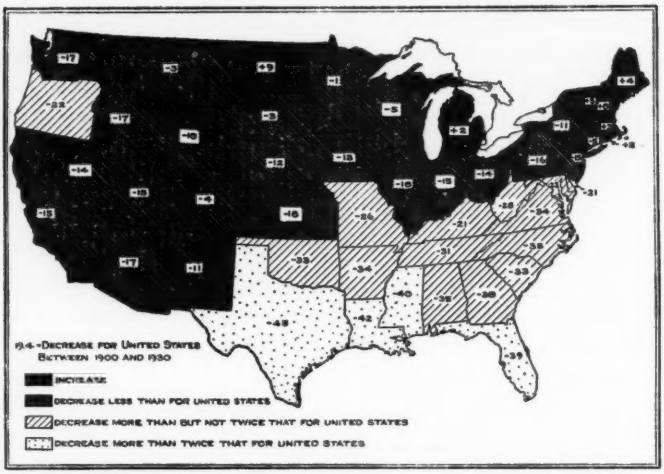

-14.-DECREASE FOR UNITED STATES BETWEEN 1900 AND 1930
INCREASE
DECREASE LESS THAN FOR UNITED STATES
DECREASE MORE THAN BUT NOT TWICE THAT FOR UNITED STATES
DECREASE MORE THAN TWICE THAT FOR UNITED STATES

Fig. 1. Changes between 1900 and 1930 in the number of children under 5 years of age of native-white parents per 100 native-white married women from 15 to 44 years of age.

than the country's average, were almost the same as the states in which in 1900 more than one-tenth of the population was of foreign birth. If we assume that the fertility of immigrant stocks falls slowly towards the rate prevalent among the older native stock, and that in consequence, where immigrants, and especially those with a high fertility rate, make a large proportion of the population, their American-born children have recruited the class of native-white women since 1900 in numbers large enough to check or overcome the tendency to a falling fertility among the older native-American stock, we might explain in that way the slower fall, or in the seven states named the actual increase, of the fertility of native whites.

To test this hypothesis let us inquire how the main immigrant stocks rank in fertility and where in the United States the most fertile stocks are settled. This problem was

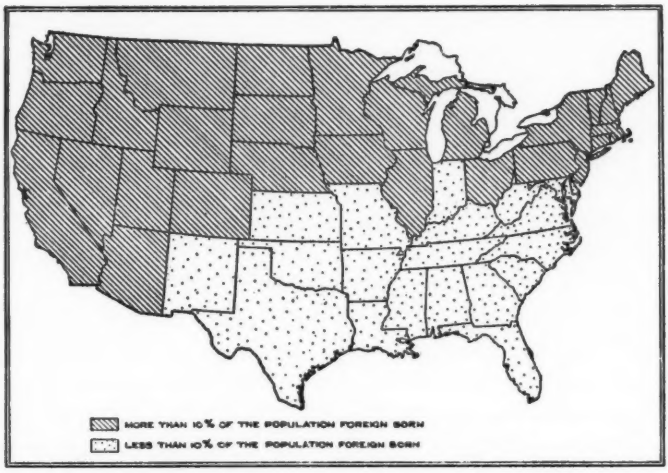


Fig. 2. States in which more than 10 per cent of the population was foreign born in 1900.

attacked a generation ago by Kuczynski, with the help of Massachusetts figures.[5] In extending his results to cover the United States, women born in Prince Edward Island, Nova Scotia, or New Brunswick and bearing children in Massachusetts in 1887-1889 have been divided between Canada French and Canada English, the latter phrase including in Federal census usage all persons born in Canada and not speaking French. If we assume that immigration from these three provinces to Massachusetts came in equal proportion from the Canada French and the Canada English population, and that the fertility of the two stocks was in the same proportion as the fertility of other women in Massachusetts from English Canada and French Canada, Kuczynski's figure for the birth rate of French Canadian women is raised from

[5]Kuczynski, R. R.: The Fecundity of the Native and Foreign Born Population in Massachusetts. *The Quarterly Journal of Economics*, November, 1901, XVI, pp. 1-36 and February, 1902, XVI, pp. 141-186.

152 to 155, and for English Canadian women from 85 to 95.

The birth rate in Massachusetts in 1887-1889 of the seven immigrant stocks which he was able to study then stands as shown in the accompanying table.

Canada French	155
Sweden	126
Germany	124
Canada English	95
Scotland	93
England	92
Ireland	77

These seven stocks included in 1900 more than two-thirds of the foreign-born population of the United States.

The next question is about the representation of these stocks severally in 1900 in those states in which at least 10 per cent of the population was of foreign birth. For this purpose an index of fertility is needed. It may be prepared by treating the fertility of these stocks in the entire United States as 100. For example, in Maine they were distributed as shown in the accompanying table and together made up 93.7 per cent of the total foreign-born in that State. If each of these per cents is multiplied by the fertility rate of that stock, the sum of the products, 107,895, exceeds the sum of the similar products for Continental United States by 48 per cent; Maine's index of fertility, therefore, is 148.

Country of Birth	*Per Cent of All Foreign-Born*
Canada French	33.1
Sweden	2.1
Germany	1.5
Canada English	38.7
Scotland	2.3
England	5.1
Ireland	10.9
Total	*93.7*

A similar index of fertility for each state in which at least 10 per cent of the population in 1900 was foreign-born is shown in Table 2, the names of the seven states for whose rise of fertility an explanation is sought being italicized.

If it were not for North Dakota's position near the bottom of the list, the hypothesis under examination would be supported by the evidence. In that State, Norwegians were and are much more numerous than any other foreign-born stock. As the birth rate of Norwegians in Norway and of Danes in

Area	Fertility Index	Area	Fertility Index	Area	Fertility Index
New Hampshire	163	Iowa	114	Utah	88
Maine	148	Ohio	112	Wyoming	86
Vermont	140	Nebraska	111	Oregon	84
Michigan	137	United States	100	Pennsylvania	84
(Cattaraugus Co.)	130	Colorado	99	California	80
Rhode Island	125	Montana	98	South Dakota	74
(North Dakota)	125	Washington	97	*North Dakota*	73
Massachusetts	118	New York	91	Nevada	73
Illinois	116	Idaho	88	Arizona	34

Table 2. Fertility index for each area in which at least 10 per cent of the population was foreign-born, 1900. (Areas in which fertility apparently rose between 1900 and 1930 are shown in italics.)

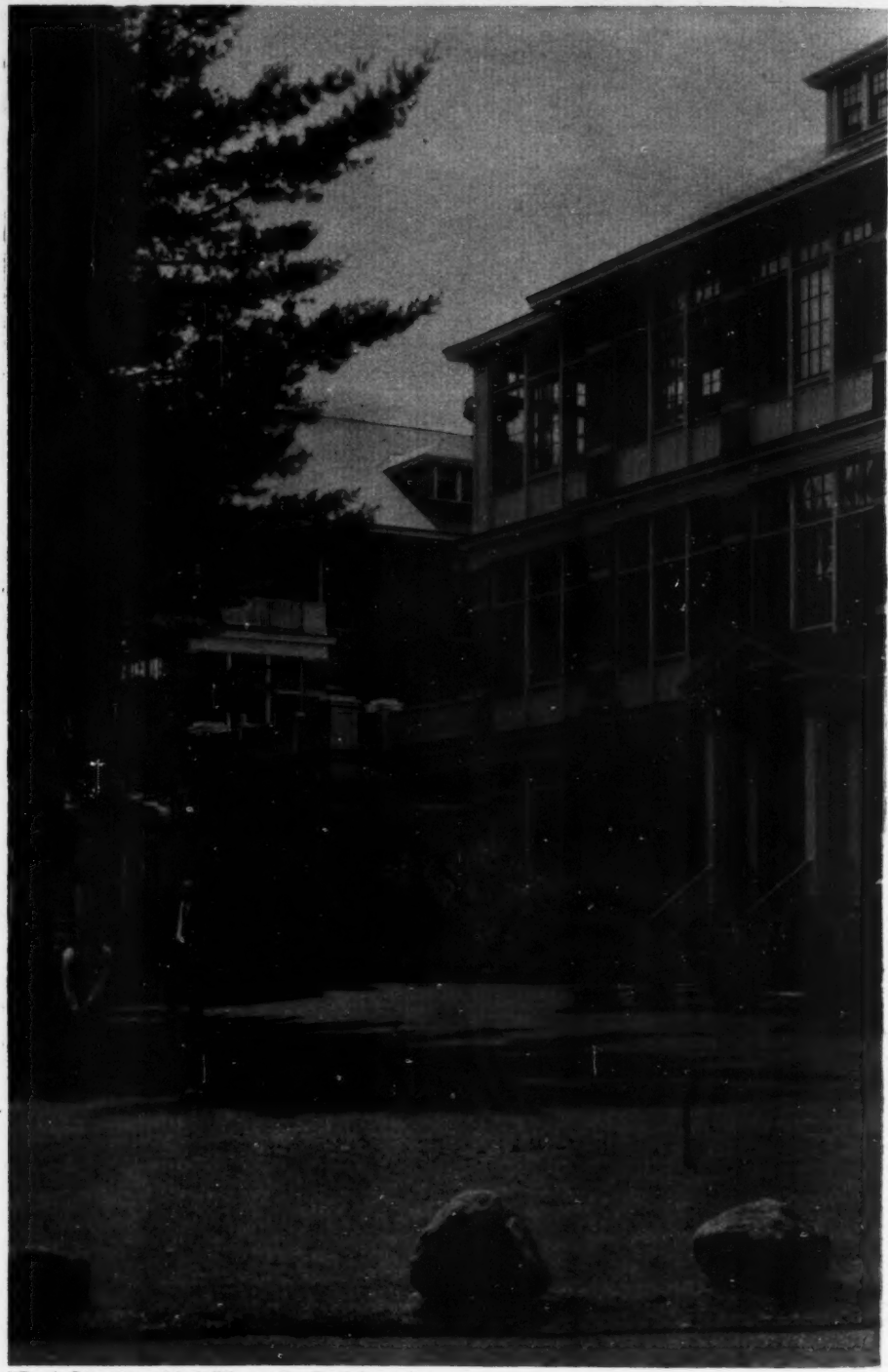
Denmark during the latter part of the last century was a little higher than that of Swedes in Sweden, I have assumed that the birth rate of Norwegians and Danes in North Dakota was the same as the birth rate of Swedes in Massachusetts. On that assumption, the index of fertility of the foreign-born in North Dakota is raised from 73 to 125, and the first seven states in the preceding list agree with the seven states in which the fertility of native-white women increased from 1900 to 1930 contrary to the general trend.

How far do these suggestions for explaining the increase in the fertility of native-white women throw light upon the surprising conditions in Cattaraugus County which started the present inquiry? More than 10 per cent of its population in 1900 was foreign-born, but few were of Canadian birth and of them nearly all were Canadian English, with a fertility less than two-thirds of that of the Canadian French. Persons of German birth, however, were two-fifths of all the foreign-born in the County and occupied much the same position as Norwegians did in North Dakota. As a result of their large number and their high birth rate, the Cattaraugus County fertility index was 130, or 43 per cent above the rate of New

York State and well within the group of seven states in the preceding list.

All this evidence seems to show that an important if not indeed the main cause of the rising fertility of native-white women since 1900 both in the seven states along the Canadian frontier and in Cattaraugus County, if it has risen there as Mr. Sydenstricker's study suggests, has been the slow permeation of the class of native-white women within the present century by American-born daughters of foreigners carrying some part of the high fertility of their stock and thus counterbalancing the tendency to a fall in the birth rate of native-white women which has been traced in all other parts of the country.

The site of the first district state tuberculosis sanatorium, near Ithaca, New York



Exterior view of one of the buildings at Ray Brook Sanatorium, established by the State of New York in 1904

THE FINAL REPORT OF THE NEW YORK STATE HEALTH COMMISSION IS REVIEWED

UPON publication, hailed by public health authorities as the most adequate survey ever made of the public health resources of New York State and as the most comprehensive state program for the conservation of individual and community health ever formulated, the final report of the New York State Health Commission, "Public Health in New York State," continues to arouse favorable comment.

One reviewer states that it is "one of the finest contributions of recent years to sound public health doctrine," while another welcomes it as "a Bible for the whole public health profession in the commonwealth and an achievement which many other states would profit by emulating." One commentator greets the book as a "landmark in public health administration" and says that it will "serve as a stimulus to the advancement of sound health organization and as a valuable source book for many health administrators." In the opinion of another, it is "a most unusual document, containing much valuable material, not only for health authorities, but for educational authorities and industrial and commercial interests," and still another appraises it as "one of the great documents in the history of American public health."

The 500-page volume issued under the imprint of the New York State Department of Health, covers every phase of public health work and presents specific recommendations for the improvement of the service in each field. It represents the results of nearly two years' study and investigation by more than a hundred experts in the science and practice of public health. The investigation was financed by a grant of the Milbank Memorial Fund.

A preliminary report of the Commission, issued in February, 1931, has already been a factor in the enactment of needed health legislation. One bill passed by the Legislature last year contained among other provisions authorization for the construction of three district state tuberculosis sanatoria and appropriations of more than $2,000,000 have been made available for their construction. By another provision, health officers in cities of over 50,000 population are required to give full time to the duties of their office. Members of the Commission recently met with the Governor of the State of New York, Franklin D. Roosevelt, to discuss further plans for carrying out the recommendations resulting from the survey.

"Not since 1913 when the late Dr. Hermann M. Biggs laid the groundwork for public health work in New York State, and the rest of the country for that matter, with his famous report on methods by which human suffering could be reduced and human life prolonged has so important a document on public health appeared as that submitted to the public last week by the state commission headed by Dr. Livingston Farrand, president of Cornell University," says the Poughkeepsie *Eagle News*. "It will be in time to come the guidebook which will supplement Dr. Biggs' work."

The editorial comments in several additional magazines and newspapers, are quoted in full or in part below.

PUBLIC HEALTH IN NEW YORK STATE

On May 1, 1930, the Governor of New York appointed a special commission to survey health conditions in that state and to offer recommendations for improvement. A preliminary report appeared on Feb. 16, 1931, and the final report, suitably bound for permanent record, has just been made available. The Commission was headed by Dr. Livingston Farrand, and its secretary was the health commissioner of the State, Dr. Thomas Parran, Jr. Every reputable medical and public health agency in the State cooperated in the development of

the material, organized medicine being represented by the Medical Society of the State of New York. Among the striking observations is the evidence of great inequalities within the same state not only as to health conditions in general but particularly in reference to the control of certain diseases. Tuberculosis receives vast amounts of attention in comparison to what is done for syphilis and cancer. Some municipalities have been able to stamp out diphtheria entirely, whereas in others the disease continues to occur and even to increase in its incidence. Infant mortality varies greatly from the worst to the best.

In his foreword to the report, Governor Franklin D. Roosevelt indicates his approval of the results of demonstrations in Cattaraugus County, Syracuse, and the Bellevue-Yorkville district of New York City. He emphasizes particularly the inadequacy of town and village boards of health, suitable in 1850, to meet the conditions of 1932. The Commission urges the creation of 57 county boards of health to replace the present 1,158 town and village boards. Of especial significance is the opinion of the Commission that health functions which local governments can be equipped to perform satisfactorily for themselves should not remain functions of the state. It is recognized that a central control with power might be exceedingly efficient, exactly as is the control of highways by a state department of public works. However, as Governor Roosevelt emphasizes, roads have a single, simple, impersonal function, whereas health service has multiple intimately personal functions. Governor Roosevelt would reserve as the ultimate functions of the state only the maintenance of adequate standards, financial assistance for rural health, and such duties as the hospitalization of mental diseases, the general supervision of public water supplies, and the registration of births and deaths. Those functions are so technical, so broad in scope, or so costly as to be unsuitable for satisfactory local administration.

Special attention is also given to the necessity for coordination of various health activities under a single head or through interdepartmental action. Public health education, child health and protection, statewide sanitary problems, the improvement of milk supplies, industrial hygiene, and the prevention of accidents are projects that may affect many different departments of the government.

The Governor's consideration of the report of his Commission concludes with special emphasis on the necessity for public health education and with particular attention to the mental hygiene program. Mental disease is becoming increasingly a problem of great importance. The New York State government maintains 26 institutions, with more than 50,000 patients, and a program is planned for the future to take care of many additional patients. Obviously, local communities cannot well undertake this function, at least under circumstances existing

at present; but a campaign of education and study might well serve as a preventive factor in diminishing as much as possible the increasing burden of mentally defective persons on the state.

Whereas the foreword of Governor Roosevelt to this exceedingly important volume outlines fully the scope of the considerations, the individual chapters constitute a textbook of public health. Nearly a hundred people participated in the work of this Commission, and the views of these experts, as well as of all those associated with the White House Conference on Child Health, have been surveyed in developing this volume. The report makes no attempt to handle the question of the cost of medical care, awaiting instead the report of the committee on that subject, which expects shortly to announce the report of its five-year study.

Rarely is there opportunity in any community for such a searching and competent survey as has been made in New York State. The results in the form of recommendations to individual communities, recommendations for legislative action and similar topics are bound to have a far-reaching effect.

—*From* THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, April 30, 1932

HEALTH IN THIS STATE

Governor Roosevelt's foreword to the report of the New York State Health Commission—an unofficial body of fourteen appointed by him two years ago under the chairmanship of President Livingston Farrand of Cornell—speaks of the health of the people as the State's "paramount concern." The following brief summary suggests that recent improvement has been creditable.

The span of life expectancy has lengthened from 47 years in 1900 to 57 years in 1930. Tuberculosis, which fifteen years ago stood as the first cause of death, has declined more than half. Deaths among infants under one year of age have shown a similar reduction. Typhoid fever, once very prevalent, is now a rare disease. Diphtheria since 1913 has diminished more than two-thirds. During the same period the death rate from all communicable diseases has decreased from 419.3 to 196 per hundred thousand population, while the general death rate from all causes decreased 14 per cent.

These results show that even on economic grounds what has been done through scientific research into the cause, prevention, and cure of disease, through the teaching of hygiene in the schools, and through the better medical service and general heightened standards of living, has been profitable to the State as well as a blessing to thousands of individuals. Even the depression has resulted in no serious increase in our death or sickness rates. For this we may be thankful to the legislation and health practices following the recommendations of a like commission under the chairmanship of Dr. Biggs in 1913. On the

other hand, there is still marked inequality in the health service in different communities and an "unevenness of popular sentiment for health action." Diphtheria continues in some municipalities, while others have been able to stamp it out completely, and in some places tuberculosis is "twice as prevalent" as in others.

The system of administration by town and village boards is in some measure responsible for this, being as "wasteful of lives as of money." The chief recommendation of the Commission is that the health service in the State be reorganized by making the county the unit, with a board of health and a health commissioner for every county. The program, which is one of decentralization but with continued state aid, is for the most part in promotion of health through education and the prevention or control of disease. The health of children is the outstanding concern, but with the lengthening of the average life, increasing attention must now be given to the degenerative diseases and especially to the diagnosis and treatment of cancer.

The Farrand report will be a guide for the public health development during the coming twenty years, as the Biggs report has been for the last two decades.

—*From* THE NEW YORK (*New York*) TIMES, April 6, 1932

CONSERVING LIVES AND HEALTH

Governor Roosevelt places the proper characterization upon the report of the Commission appointed two years ago to develop a health plan for the State of New York when he describes it as an "inspiration and an indictment." It should inspire all residents of the commonwealth to give more thought to the conservation of life and health and thereby dissolve the indictment of carelessness and thoughtlessness. The Commission is not extravagant in its estimate that the lives of 50,000 New Yorkers can be saved every year. This number embraces only the people who die from diseases or what is termed natural causes. Fatalities from accidents are not included but should and could be greatly decreased.

Of course in the conservation of life the question of maintaining health is the important factor. We know that now there should be practically no deaths from diphtheria and typhoid fever. Science has conquered both where people cooperate with physicians and health officers. Actual experience has proved that at least 50 per cent of the cases of tuberculosis can be arrested and that although little is known as yet about the causes of cancer this malady can be permanently arrested if treated in an early stage of its development. We know that infant mortality has been materially decreased during the last few years and that the further reduction is possible. . . . . .

When officials find that death and sickness rates in some communities are double those in others

the inference must follow that civic and professional indifference must prevail in the less fortunate places. There should be some agency or factor to prevent or to rectify such a situation. Our health laws are now drastic and if they do not produce reasonable results they are either unobserved or unenforced. People who value life and health or have conception of their worth should cooperate with officials in their conservation. And there should be no hesitancy in reporting derelictions in the performance of official duties.

—*From the Troy (New York)* RECORD, April 7, 1932

A ROOSEVELT SERVICE TO PUBLIC HEALTH

No doubt the most thorough state survey yet made, the interest and uses of the final report of Governor Roosevelt's special Health Commission will indeed extend outside New York. It is a volume which comprehensively justifies the title, "Public Health in New York State." A remark from the New York Governor's comment on the document forcibly illustrates its largest significance: "Other than the indifference of local governments there is no reason why twice as many babies should die each year in some counties and cities as in other communities where a modern health program is in force, or for tuberculosis to be twice as prevalent in some counties of New York as in others."

Wherein states on the whole when compared seem to excel or lag in health conservation is minor. Especially in the large states the question of effective health administration is local rather than general and is chiefly dependent upon the cities and counties. Citations so complete and convincing as this report affords of varying health conditions in the most populous of our states aptly demonstrate that better health administrations save lives and can compel the report's widespread study by legislators and social and civic leaders.

—*From the Detroit (Michigan)* NEWS April, 4, 1932

THE HEALTH REPORT

The report of the New York State Health Commission, presented to Governor Roosevelt a few days ago for his approval, indicates the splendid progress and achievement of the Commission since its appointment less than two years ago. The report, representing constant study, research, and investigation of the health requirements of the State by 100 experts in the science of public health, is a document which reflects credit not only upon the Commission, but upon the entire State.

As a result of its recommendations, laws were enacted and passed authorizing the building of three tuberculosis sanitoria for counties too small to provide their own institutions for this highly important phase of health work; the jurisdiction of the state hospital for incipient tuberculosis

transferred to the control of the State Department of Health; creation of a new division of cancer control under the supervision of the Department; and the appointment of full-time health officers in cities of more than fifty thousand population.

These are only a few of the praiseworthy accomplishments of the Commission, which is doing all in its power—and with outstanding success—to create the highest possible degree of good health among the people of the State of New York. The work of the Commission is commendable, and the entire State should be duly appreciative for the tireless efforts being exerted in its behalf.

—*From the Ticonderoga (New York)* SENTINEL, April 14, 1932

CONCERNING THE FARRAND HEALTH COMMISSION REPORT

From the standpoint of protection of health and conservation of life the masterly study and statesmanlike recommendations embodied in the recent final report of Governor Roosevelt's special State Health Commission, headed by President Livingston Farrand, M.D., of Cornell University, promise far-reaching human benefits and economies . . . . . .

For the next quarter of a century public health developments are bound to be influenced and guided by the work of the Farrand Commission. Unquestionably too its recommendations will effectively contribute at the same time to the improvement of public health throughout the nation. To those who have given so generously of their time and thought as members of the Commission the public is deeply indebted.

—*From the* SYRACUSE *(New York)* HERALD, April 17, 1932

THE SAVING OF LIFE

The final report of the State Health Commission, headed by Dr. Livingston Farrand, president of Cornell University, has just been submitted to Governor Roosevelt.

The report contains some arresting statements. It declares, for instance, that forty-three thousand people in New York State alone are now living who would have died last year if the death rates of twenty years ago had continued.

But, even more phenomenal results can be attained during the next twenty years, it adds, "if the simple, well-known facts on which public health science is based are put into practice everywhere throughout the State." . . .

All of which is very encouraging. The Commission would seem to have made a very thorough study of the subject in hand. It is to be hoped that its recommendations will be given every consideration by the legislative body.

—*From the Gloversville (New York)* HERALD, April 8, 1932

DEATHS OF NONRESIDENTS IN SYRACUSE[1]

by ELLIOTT H. PENNELL

THE importance of changing the present statistical practice of ascribing deaths to the locality in which they happen to occur by allocating them to the place of residence of the decedents has long been recognized. Dr. Otto R. Eichel's early paper, followed by Dr. Joseph V. DePorte's illuminating studies in New York State, have clearly demonstrated that death rates computed upon the present basis are usually erroneous and frequently are grossly misleading. With the increasing hospitalization of sick persons in centers where hospitals exist or in areas where sanitoria are provided, it is evident that the error due to this purely statistical procedure will increase rather than diminish. It is no longer possible to ignore residence as a factor in the accuracy of mortality rates by considering it as a compensating error, that is, on the assumption that the nonresident deaths are balanced by a corresponding number of residents dying elsewhere. Nor is it excusable to regard it as a potential error, the significance of which can not be determined for lack of available data, for some data are at hand and better data can be had.

[1]From the Division of Research, Milbank Memorial Fund. This is the fifth in a series of papers on the accuracy of vital statistics, the preceding papers being as follows:

Downes, Jean: The Accuracy of the Recorded Birth Statistics in Urban and Rural Areas. *Journal of the American Statistical Association*, March, 1929, xxiv, p. 165.

Wiehl, Dorothy G.: The Correction of Infant Mortality Rates for Residence. *American Journal of Public Health*, May, 1929, xix, pp. 495–510.

Sydenstricker, Edgar: The Trend of Tuberculosis Mortality in Rural and Urban Areas. *American Review of Tuberculosis*, May, 1929, xix, pp. 461–482.

Downes, Jean: The Accuracy of Official Tuberculosis Death Rates. *Journal of the American Statistical Association*, December, 1931, xxvi, pp. 393–406.

In spite of the manifest inaccuracy resulting from this procedure, the *official* mortality rates for the federal registration area, all states and nearly all cities, continue to be computed without adequate correction. Even such attempts as have been made relate to the gross death rates only with the notable exception of the work of DePorte in New York[2] and the interesting paper of Downes on tuberculosis in Cattaraugus County.[3] Other than these attempts the effect of failure to correct for residence of decedents upon *specific* death rates for sex, age, and cause has not been taken into account.

As a contribution to this desired information, the mortality records for a number of years of nonresidents dying in Syracuse, New York, were studied. Syracuse was selected partly because of familiarity with the records by reason of the Milbank Memorial Fund's interest in the development of public health activities there and partly because Syracuse is an excellent example of an urban area which may be said to attract deaths of nonresidents for various reasons. It should be noted that Syracuse is a city of approximately 200,000 inhabitants, is near the geographical center of New York State, and is the county seat for Onondaga County. It is connected with a large surrounding area by railroads, interurban railways, and bus lines, contains a large number of manufacturing enterprises, is the seat of Syracuse University, with 6,000 students and a medical school, is equipped with progressive health administration, and has good clinical and hospital facilities.

In the preparation of this paper the death certificates on file at the Syracuse Department of Health covering the years

[2]DePorte, J. V., M.D.: Reports of the Division of Vital Statistics, New York State Department of Health 1926–1929, and various papers on tuberculosis and cancer.

[3]Downes, Jean: The Accuracy of Official Tuberculosis Death Rates. *Journal of the American Statistical Association*, December, 1931, xxvi, pp. 393–406.

County	Deaths	County	Deaths	County	Deaths
Albany	6	Herkimer	17	Rensselaer	4
Allegany	2	Jefferson	28	Richmond	3
Broome	10	Kings	5	St. Lawrence	20
Cattaraugus	1	Lewis	9	Saratoga	1
Cayuga	61	Livingston	1	Schenectady	2
Chautauqua	8	Madison	130	Schoharie	1
Chemung	3	Monroe	16	Seneca	10
Chenango	12	Montgomery	8	Steuben	3
Clinton	1	Nassau	5	Tioga	3
Columbia	3	New York	26	Tompkins	10
Cortland	23	Niagara	2	Ulster	1
Delaware	2	Oneida	45	Warren	1
Erie	9	Ontario	9	Washington	2
Essex	3	Orange	5	Wayne	23
Franklin	5	Oswego	193	Westchester	2
Fulton	2	Otsego	5	Wyoming	1
Genesee	1	Queens	1	Yates	8

Table 1. Distribution of nonresident deaths in Syracuse, New York, 1924–1929, by county of former residence.

1915, 1920, and 1924-1929 were examined with respect to residence of decedent. The certificates for nonresident deaths for 1915 and 1920 were extracted and then tabulated by sex, age, cause of death, et cetera. There were certain deaths, from chronic causes especially, of nonresidents whose residence in Syracuse had exceeded one year but did not exceed the duration given for the chronic condition. Certificates on which place of former residence was not given were included with the resident deaths. In classifying according to residence the rules used by Dr. Eichel[4] in his paper on nonresident deaths in certain cities and areas in New York, were essentially followed. Infant deaths, however, were allocated to residence of mother, as was done by Dr. DePorte in his later studies.

[4]Eichel, Otto R., M.D.: So-called Nonresident Deaths—A preliminary note on an experimental study of this subject in New York State. *American Journal of Public Health*, September, 1919, ix, No. 9, pp. 654–662.

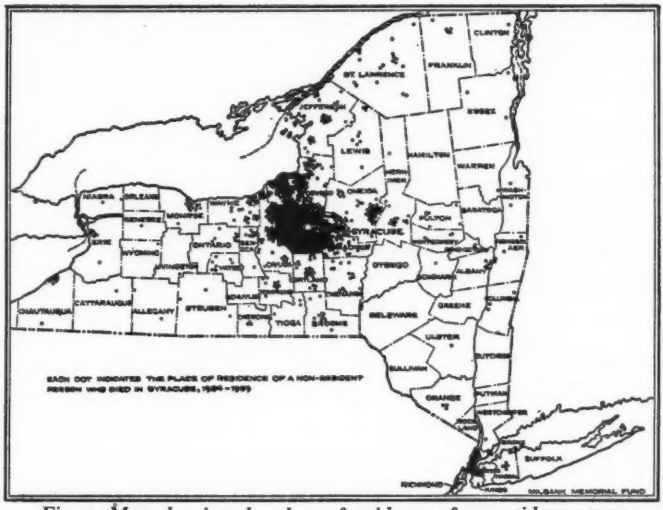


Fig. 1. Map showing the place of residence of nonresident persons who died in Syracuse, 1924-1929.

Of the 14,776 deaths recorded in Syracuse for the period 1924-1929, 2,133 or 14.4 per cent were classified as of nonresidents. It was not practicable at the time to consider the deaths of Syracuse residents that occurred outside of that City, but Dr. DePorte in his annual reports has shown that these deaths by no means balance the deaths of nonresidents in Syracuse. For the years 1927-1929 his corrections for residence of decedents reduced the officially recorded rates by 0.6, 1.3, and 0.7 per 1,000 population, or an average of 6.7 per cent. These rates represented approximately 500 deaths for the three-year period. Although the present paper relates to only one side of the problem of correcting for residence, the data suggest the effects of failure to make this correction upon rates specific for sex, age, and cause in a locality where the deaths of nonresidents outbalance deaths of residents elsewhere.

Year	1915	1920	1924	1925	1926	1927	1928	1929	1924-29
Total deaths	*2,011*	*2,640*	*2,253*	*2,280*	*2,506*	*2,417*	*2,701*	*2,619*	*14,776*
Nonresident deaths	142	209	285	350	358	295	429	416	2,133
Per cent nonresident	7.1	7.9	12.6	15.4	14.3	12.2	15.9	15.9	14.4

Table 2. Total deaths occurring in Syracuse, New York, and numbers allocated to former residence for certain years, 1915–1929.

Before presenting the data for sex, age, and cause, it will be of interest to see where the nonresidents dying in Syracuse come from. (Table 1, Fig. 1.) As might be expected, Onondaga County, in which the City of Syracuse is located, contributed 1,245 nonresident deaths in Syracuse, or approximately 60 per cent of nonresident deaths in the period 1924-1929. Smaller concentrations appear in Oswego County, with 193 nonresident deaths; in Madison County, with 130; in Cayuga County, with 61; in Oneida County, with 45; and in Jefferson County, with 28. These concentrations were partly due to certain population centers located there. In fact, if we exclude Onondaga County, 27 per cent were from villages of 500 inhabitants or less, and 39 per cent were from places with populations of under 1,000. In Onondaga the greatest percentages were 28 and 39.

The fact that the proportion of total deaths in Syracuse

Table 3. Per cent of deaths annually occurring in Syracuse, New York, in 1924–1929 that were of nonresidents, by sex.

Sex	1924	1925	1926	1927	1928	1929	1924–29
Male	12.6	16.6	15.1	13.1	17.0	16.3	15.2
Female	12.6	14.1	13.5	11.3	14.7	15.5	13.6

has been increasing,[5] as shown by Table 2, indicates the growing importance of allocating deaths according to place of residence of decedents rather than to the places where they happen to die. This is fully realized by the New York State Department of Health which is annually publishing the rates corrected for residence for all causes and for some of the important causes. The increase in the nonresident deaths in a city such as Syracuse is largely due to the fact that the use of the hospitals and other institutions which exist there has increased. Throughout the six years under consideration, 79 per cent of the nonresident deaths occurred in hospitals and there was no significant deviation from this proportion in any of the six years.

Table 4. Per cent of deaths occurring in Syracuse, New York, 1924–1929, that were of nonresidents, by sex and age.

Age Group	Per Cent of Deaths that were of Nonresidents			Total			Of Nonresidents		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Under 1	14.9	14.7	15.2	1,579	882	697	236	130	106
1	15.6	12.1	20.2	250	141	109	39	17	22
2– 4	16.9	12.5	22.2	261	144	117	44	18	26
5– 9	21.6	24.4	18.0	227	127	100	49	31	18
10–19	24.7	28.2	20.8	361	188	173	89	53	36
20–29	21.3	23.1	19.6	611	294	317	130	68	62
30–39	19.1	17.6	20.7	971	516	455	185	91	94
40–49	16.5	16.2	16.8	1,470	816	654	242	132	110
50–59	14.9	14.5	15.3	2,163	1,157	1,006	322	168	154
60–69	12.9	13.6	12.2	2,884	1,523	1,361	373	207	166
70–79	11.5	14.7	8.6	2,599	1,218	1,381	298	179	119
80 +	9.0	9.8	8.5	1,400	561	839	126	55	71

[5]Dr. Eichel, studying the records for the first six months of 1918, found that the deaths of nonresidents in Syracuse and of Syracuse residents elsewhere were almost equal. Deaths of nonresidents in Syracuse in later years thus became a more important factor in the accuracy of crude rates for the later years.

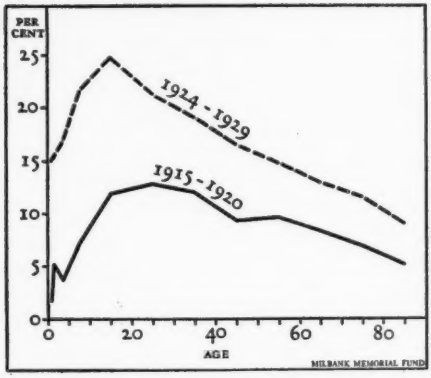
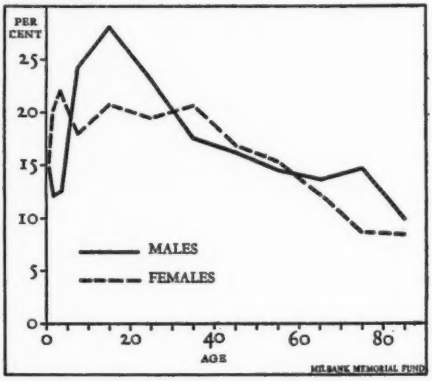


Fig. 2. Per cent of deaths at different ages registered in Syracuse that were found to be of nonresidents: average of 1915 and 1920 compared with average of 1924–1929.

From the point of view of the distribution of the nonresident deaths according to sex, it appears that 15.2 per cent of all male deaths and 13.6 per cent of all female deaths occurring in Syracuse were of nonresidents. For each of these years, except for 1924 when the percentages were the same, the male deaths showed a higher percentage of total deaths than the female, as is shown in Table 3.

In studying the age distribution of nonresident deaths, our chief interest is not in the actual number of these deaths in each age group but in their relation to the total. Table 4 and Figure 2 show the percentages that nonresident deaths were of total deaths for certain age and sex-age groups. The percentage of female nonresident deaths exceeds that of males in the age

Fig. 3. Per cent of male and female deaths at different ages registered in Syracuse in 1924–1929 that were found to be of nonresidents.



group "under five" and 30-59 years, while for all other ages a larger proportion of male deaths is shown. However, the differences are either not great or are based on small numbers, although the preponderance of males in the age group 5-29 years, where one-fourth of all male deaths were of nonresidents, is consistent and somewhat pronounced.

The percentage of total deaths which were of nonresidents in different age groups for 1915 and 1920 combined, is compared with those for the period 1924-1929 in Table 5 and Figure 3. Increases in the proportion of deaths which were of nonresidents appeared in all age groups. These increases were fairly uniform for all ages, being in a ratio of about 1.6, 1.7, 1.8 to 1, except in childhood when the percentage of nonresident deaths in 1924-1929 was over three times the average for 1915 and 1920.

Table 5. Per cent of deaths occurring in Syracuse, New York, in 1915 and 1920, and in 1924–1929 that were of nonresidents, by age.

Age Group	Per Cent of Deaths that were of Nonresidents		Number of Deaths			
			1915, 1920		1924–1929	
	1915, 1920	1924–1929	Total[1]	Of Non-residents	Total[2]	Of Non-residents
Under 1	1.8	14.9	785	14	1,579	236
1	5.3	15.6	131	7	250	39
2– 4	3.7	16.9	135	5	261	44
5– 9	7.2	21.6	83	6	227	49
10–19	12.0	24.7	133	16	361	89
20–29	12.8	21.3	335	43	611	130
30–39	12.1	19.1	406	49	971	185
40–49	9.3	16.5	442	41	1,470	242
50–59	9.6	14.9	572	55	2,163	322
60–69	8.3	12.9	661	55	2,884	373
70–79	6.9	11.5	594	41	2,599	298
80 and over	5.1	9.0	374	19	1,400	126

[1]From Mortality Statistics, Bureau of the Census.
[2]From tabulations of death certificates on file in the Department of Health, Syracuse, New York.

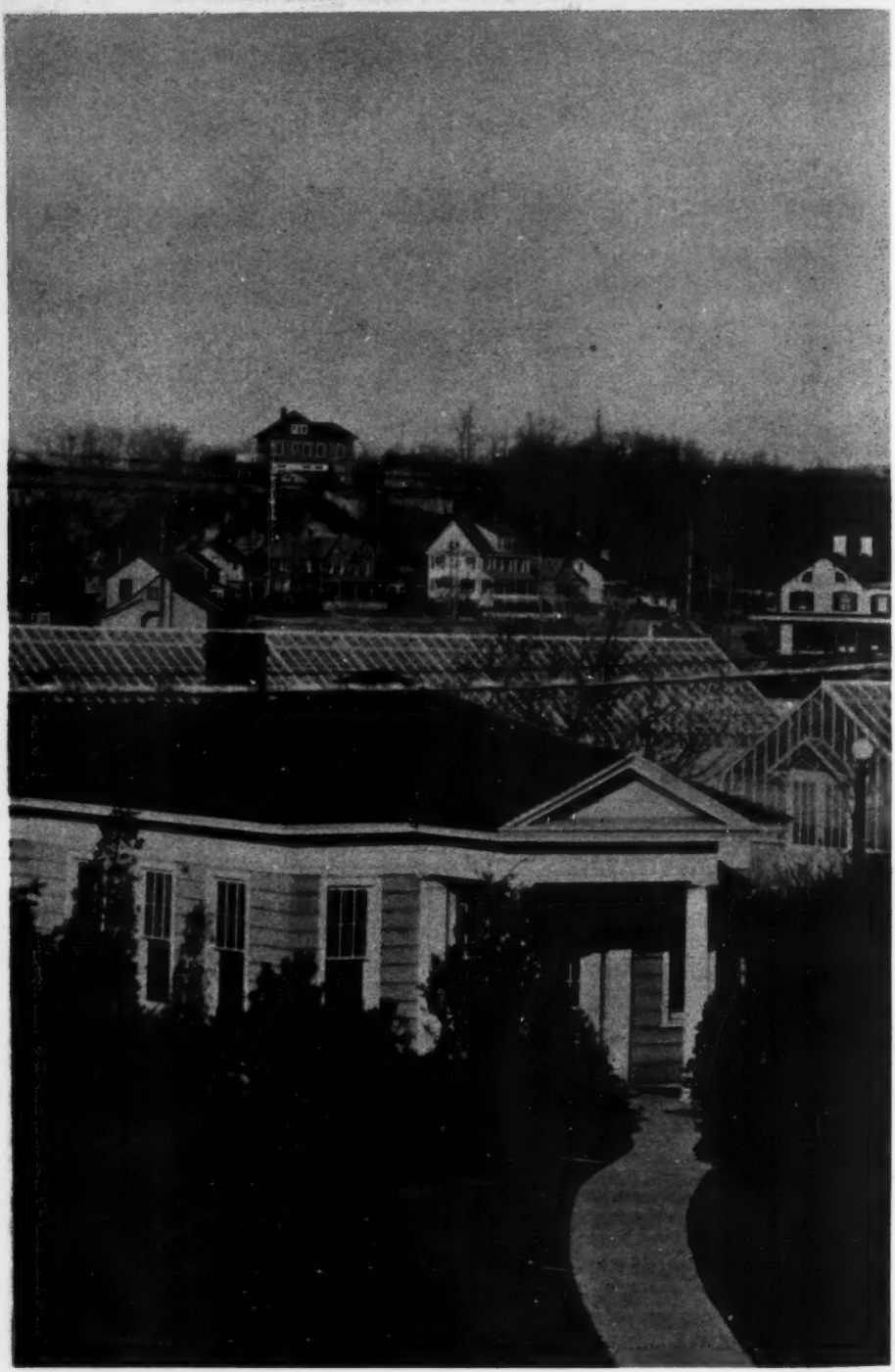
The importance of nonresident deaths in considering mortality according to cause is clearly shown. For example, the highest proportion of deaths which were of nonresidents is found in puerperal causes, although the deaths from these causes were only about 1 per cent of total deaths. On the other hand, of deaths from diseases of the circulatory system, which constitute the largest number, about 10 per cent were nonresidents. The details are given in Table 6.

It is thus quite evident that it is necessary to make corrections for residence of decedents not only for computing gross mortality rates but also for specific rates for sex, age, and cause before accurate comparisons between geographic areas and localities can be made.

Table 6. Per cent of deaths occurring in Syracuse, New York, 1924–1929 that were of nonresidents, by groups of causes.

Group of Causes (with International List Numbers)	Per Cent of Deaths that were of Nonresidents			Number of Deaths					
				Total			Of Nonresidents		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Epidemic, endemic, and infectious (1–42)	14.2	13.4	15.1	1,074	597	477	152	80	72
General diseases (43–69)	16.6	18.0	15.7	2,243	917	1,326	373	165	208
Diseases of the nervous system and of the organs of special sense (70–86)	10.5	11.3	9.8	1,551	734	817	163	83	80
Disease of the circulatory system (87–96)	9.8	10.8	8.8	3,780	1,949	1,831	372	211	161
Disease of the respiratory system (97–107)	12.5	13.6	11.1	1,554	897	657	195	122	73
Disease of the digestive system (108–127)	23.3	22.7	23.9	937	510	427	218	116	102
Nonvenereal diseases of the genito-urinary system and annexa (128–142)	14.8	16.0	13.7	1,306	626	680	193	100	93
The puerperal state (143–150)	32.1	....	32.1	165	....	165	53	....	53
Malformations (159)	16.5	19.2	13.3	182	99	83	30	19	11
Early infancy (160–163)	15.3	14.7	16.1	738	422	316	113	62	51
External causes (165–203)	21.8	23.1	19.0	1,100	752	348	240	174	66
All other causes (151–158, 164, 204, 205)	21.3	26.6	17.1	146	64	82	31	17	14

Interior view of one of the buildings at Ray Brook Sanatorium, near Saranac, for the treatment of tuberculous patients



A typical sewage disposal plant in Nassau County, New York

A NEW MEASURE OF THE PEOPLE'S HEALTH[1]

A CRITICAL SUMMARY OF MEDICAL EXAMINATION RECORDS

by ROLLO H. BRITTEN AND JENNIE C. GODDARD

I

INTO the field of vital statistics has entered a new measure of the health of the population—the extent of physical impairment or disease as determined by medical examination, with its accompanying record of the individual's disease history. In appraising this new measure, two aspects need consideration: first, the value to the person examined, and second, the significance of statistics based on a group of examinations. The present discussion, although it has an indirect bearing on the usefulness of the periodic health examination to the individual, deals primarily with results obtained from the analysis of the records.

Because of their widely varying character, it is not possible to treat medical examinations as a single source of information. Different types which may be mentioned are: (1) the so-called "health" examinations made by private physicians or by those employed by special organizations for the purpose of informing the individual as to his health status; (2) examinations made by life insurance companies to determine whether insurance should be withheld because of medical impairment; (3) examinations of applicants for industrial employment to determine whether they should be rejected or assigned to work for which they are physically suited; (4) examinations for military service, having in mind

[1]Studies in the Diseases of Adult Life No. 8, from the Division of Research, Milbank Memorial Fund. Previous articles in the series will be found listed at the end. Acknowledgment is made to the Life Extension Institute and its statistician, Miss Elizabeth W. McKee, for constant cooperation and advice, and to the United States Public Health Service for making available the services of the writers.

especially those given in connection with the World War draft; (5) examinations in school or college, made to determine the physical condition and the nature of physical training which is desirable to improve that condition; (6) general or special examinations of limited groups of the population in connection with specific investigations, the information being used to determine whether conditions adverse to health are present.

Although to a certain degree the same methods are used in all these types, yet it is manifest that there will be a wide variation in the thoroughness with which the examinations of different types are carried out and the extent to which supplementary laboratory procedures are invoked. No one point is more fundamental in the interpretation of the records of medical examinations than the necessity of considering the purpose for which they were made. We have in mind particularly those phases which may be termed nonquantitative—the record of diseases or defects, the laboratory results, and the history of previous disease. One side of the examination is of more general validity regardless of the type—namely certain quantitative measurements (height, weight, chest or abdominal measurements, blood pressure, pulse rate, hemoglobin readings, Snellen tests of vision). A certain absolute value may be assigned to these, although they cannot be said to furnish any real picture of the general health status of a population group.

It will be of interest to appraise medical examination records in relation to other measures bearing on the health of the population. Until recent years, mortality statistics have been almost the sole source of information. For statistical purposes death seems a very valuable index because of its absolute character. Now that certification of deaths is quite complete we may feel that we have some information with

respect to every event which needs to come under consideration. However, anyone who has attempted to interpret mortality statistics is well aware that great difficulties arise from inaccurate diagnosis and, moreover, that mortality is not in any way an index of sickness itself.

This latter fact has led to the attempt to measure health in terms of morbidity records. Unlike death, sickness, unless we are to confine our attention to certain definite communicable diseases, lacks the precision that is desirable in statistical analysis. Its beginning and its end are frequently indeterminate and often its very existence is doubtful. When official records of sickness are depended on, many other uncertainties make their appearance, because it is necessary to define sickness in terms of some outside occurrence, such as disability. There are, therefore, many sources of data in regard to sickness, differing widely from each other and not in the least comparable with respect to the statistics derived from them. From the point of view of governmental vital statistics, necessarily based on the notifiable diseases, one can almost say that sickness records are still of little utility as any measure of the general health of the population.

Realization of these difficulties has recently led to the development of a method of observing sickness in a sample of the population by cross-section surveys, or by repeated visits to the homes, possibly over a period of several years. There is nothing in common between a record obtained in this way and the official records of reportable diseases. Several studies in this field have given us a more adequate conception of the people's health. The Hagerstown studies are an example.[2]

However, it is only natural to feel that mortality and mor-

[2]Sydenstricker, Edgar: Hagerstown Morbidity Studies. A Study of Illness in a Typical Population Group. Reprints 1113, 1116, 1134, 1163, 1167, 1172, 1225, 1227, 1229, 1294, 1303, and 1312 from the *Public Health Reports*.

bidity records, as we know them, are only the end results of bodily disorders, when, as a matter of fact, our real interest may lie in incipient departures from health. Not only is this true in the case of the individual who would like to become aware of such dangers at the earliest possible time in order to effect a cure; but it is equally true from the viewpoint of any

Table 1. Examples of variations in the rate of impairment in different investigations. (Percentage of males examined, aged 40–59 years.)

Investigation	Enlarged or Diseased Tonsils[1]	Defective Hearing	Enlarged Heart	Arterial Thickening		Hernia
				Slight	Moderate and Marked	
Life Extension Institute						
Policy holders, "head"	60.2	21.2	3.6	29.5	6.0	10.5
Policy holders, "field"	22.6	14.5	3.2	11.3	3.3	7.6
Regular service	37.5	35.4	*	65.5	15.4	*
Public Health Service[2]						
Garment	8.2	27.2	8.5	3.4	9.8	14.0
Glass	4.3	39.3	4.3	1.7	.2	10.6
Pottery	2.8	11.9	1.6	12.6	2.3	5.2
Foundry	49.4	63.5	6.4	13.2	15.2	10.7
Post Office	46.3	20.9	4.6	23.7	9.1	13.1
Steel	13.3	23.0	10.9	26.1	3.6	13.9
Chemical	10.1	29.0	6.1	23.5	1.7	33.5
Life Conservation Studies[3]						
Office	5.3	45.9	16.8	*	.4	1.9
Industrial—white	21.7	32.9	13.4	*	1.3	5.4
Industrial—negro	10.5	15.3	34.1	*	2.9	18.1

[1]Data from the United States Public Health Service and the Life Conservation Studies are for diseased and enlarged tonsils.

[2]Britten, Rollo H., and Thompson, L. R.: A Health Study of Ten Thousand Male Industrial Workers. Public Health Bulletin No. 162.

[3]Life Conservation Studies. I. Physical Impairment Among Office Workers. II. Physical Impairment Among Industrial Workers. III. Physical Impairment Among Negro Factory Workers. From the Heart Council of Greater Cincinnati.

*Data not available.

population group as a whole—for instance, attempts to detect the presence of some industrial hazard before its end results in death or serious sickness have occurred.

II

It seems to be a common habit of mind, in the presence of obstacles, to embrace a new method with great enthusiasm. And thus it has come about that the medical examination has carried in its wake many compilations of statistics. One of the characteristics of these publications has been an endeavor to give the same reality to rates based on impairments that can reasonably be given to rates based on mortality; and yet adequate comparisons would seem to show that such rates, taken in any absolute sense, have very little meaning. For instance, Table 1 presents the percentage of persons found to have certain impairments, as ascertained from various types of examinations. The comparison has been limited to three classes of data which might be supposed to have much in common, and has purposely omitted reference to radically different types; such as applicant examinations for insurance or for employment. To avoid discrepancies due to age, the data are limited to a single age group (40–59 years). No attempt has been made to be exhaustive (many other impairments would show similar variations) but the contrast is so great that laborious comparisons are unnecessary. Admitting that the groups studied may differ radically from each other in some particulars, yet we still have no explanation for the entirely discordant results except in the examinations themselves. The primary difficulty evidently lies in differences in the purpose and thoroughness of a particular type or group of examinations. Before any meaning can attach to a statement that a certain proportion of the population has a given impairment, we must know many facts in regard to the technique used in the examinations that yielded this result—that is, the

percentage is not absolute; it is a function of the type of examination.

The reason why it is possible for the results to vary so widely from study to study lies particularly in the fact that serious impairments in any population group are greatly outnumbered by minor impairments, and yet the statistical results must, we might say, give the same weight to the two things. A slight enlargement of the heart would count as much in the statistics as a serious pathological condition. Some attempt to eliminate this difficulty by grouping cases as to their severity has been made, but it cannot be said to have succeeded. In the absence of any quantitative separation as to degree, one might almost feel that the difficulty cannot be solved, because within any one degree the less severe cases are again greatly in the majority.

It is the shading off into normality that gives this indefiniteness to impairment percentages. Mortality rates are real in the sense that a death is a death; morbidity rates for many diseases frequently have the same reality, because, in terms of recognizable cases, a person either has or has not the disease. We are not blind to instances in which this same indefiniteness pervades the sickness statistics; but as a rule such data, incomplete as they are, deal with conditions which either are or are not present, and the chief necessity is for a definition (such as paralysis in poliomyelitis) as to what may be said statistically to constitute a case. Contrast this situation with enlarged or diseased tonsils, as determined on physical examination—where all gradations from normal to serious enlargement occur. Table 1 shows the widely differing percentages which may be observed. One study showed 60 per cent, another study, 3 per cent. How are we to set up any given percentage and say that this represents the proportion of people with enlarged tonsils?

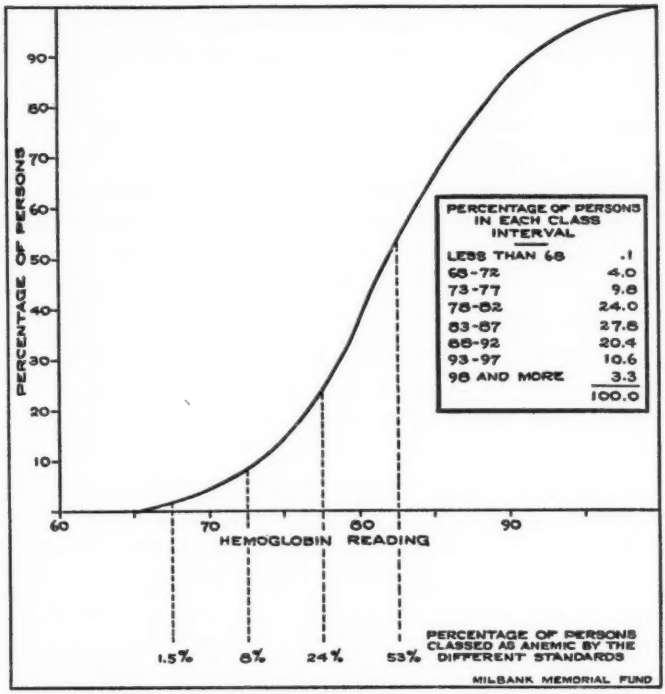


Fig. 1. Proportion of persons with hemoglobin readings of specified amounts or more, with percentages classed as anemic by different standards. (All ages, regular service.)

The greater prevalence of cases which are on the border line between the normal and the pathological is well indicated by the figures for arterial thickening in Table 1. In the Life Extension Institute data analyzed (all ages),[3] 9,975 persons were classified as having slight arterial thickening, 2,372 as moderate, 257 as marked. If forty times as many people show "slight" arterial thickening as "marked," how can we feel

[3]Based on examinations of life insurance policy holders at the "head" offices and in the "field."

that there is any absolute validity to the percentages? A slight variation in the doctor's criteria will make an immense difference in the rate. Since it is easier to appreciate this difficulty in instances where we can actually trace the effect of a slight difference in standard, we have chosen one in which quantitative data are available—anemia, as judged by the hemoglobin index. Suppose, hypothetically, we were asked to classify a group of people as to whether they were anemic or not on the basis of such readings. Our criterion would be a definite point on the hemoglobin percentage scale; but one person might say that this point should be 83, another 78, another 73, another 68.[4] In Figure 1, we have attempted to show what happens to the proportion of people classed as anemic with these shifts in the criteria. It will be noted that the proportion varies tremendously (53 per cent, 24 per cent, 8 per cent, and 1.5 per cent for these four standards). One ought not to rush into print with the statement that such-and-such a percentage of people are anemic. Instead it could be said that such a percentage showed hemoglobin readings below a given point, or better still one might give the distribution of individuals as to their hemoglobin readings. Yet, when conditions are considered for which no quantitative basis of this sort is available, and where the statistical analyst is on still weaker ground because he is guessing as to the examiner's standards of diagnosis, there does not seem to be any hesitancy on the part of some in relying on percentages of people showing given impairments. They blithely say that 5 per cent of persons have varicose veins, without being aware of the inconsistency into which they have fallen. In the light of what has just been shown for anemia, it is evident that a slight change in the standard as

[4]Because of the tendency for the use of round numbers (41 per cent of the readings were divisible by five while 20 per cent would be expected by chance), class intervals are used which will place the round numbers in the center.

to what constitutes varicosity would have a great effect upon the proportion showing this condition.

Another weakness in the interpretation of impairment rates lies in the impossibility of combining them. Any figures attempting to parallel the "all causes" rates of mortality are purely fictitious. One frequent method of handling this lies in summing up all of the impairments recorded to obtain *the number of impairments per person*. It is immediately evident that this rate is determined largely by relatively unimportant conditions. In other words, the errors arising from giving excessive weight to minor degrees or borderline cases are magnified manifold by also giving excessive weight to entities which are of no general significance to health. Attempts are made to select the more severe conditions; but no two physicians will agree on such selection, and furthermore, it is not based on the severity of a condition in particular cases, but on general principles.

In the course of an analysis of the Life Extension Institute examinations, it seemed desirable to estimate the relative healthiness of persons in twenty-eight occupations. But when different methods were used to obtain a summary of this kind, it was found that the results were so widely different as

Table 2. Degree of correspondence resulting from ranking twenty-eight occupations according to the number of impairments per person and according to eleven other methods of classification (percentage of instances).[1]

Rank According to Impairments per Person	Rank According to Each of 11 Other Classifications				
	1–7	8–14	15–21	22–28	Total
1– 7	41	33	17	9	100
8–14	3	33	18	16	100
15–21	30	22	34	24	100
22–28	24	14	30	51	100

[1]Based on Life Extension Institute examinations of policy holders in the "field."

to have no meaning. This was shown by ranking the twenty-eight occupations according to twelve different classifications, including the number of impairments per person, the percentage of times the occupation had rates for specific impairments above the average, and the percentage of times the difference was significant for all causes and for serious causes as determined by different experts. If the ranking as to impairment per person (all causes) is contrasted with various other rankings, this low correlation becomes manifest. (Table 2.) In the light of these findings, no effort is made in this paper to show rates for combined groups of impairments.

There are many other difficulties in the way of comparable statistics of physical examinations. As an example, it is interesting to observe the effect of fat on the proportion of persons with certain conditions. In Table 3 are given the impairment percentages of persons in various weight classes. The comparison is limited to a few conditions which are of moment for the purpose we have in mind. Consistently these diseases and defects are found to occur more frequently among the underweight people. The conclusion seems un-

Table 3. Proportion of white males with certain impairments[1] according to percentage below and above average weight for height and age. (Rates for age groups 30–39 and 45–64 averaged.)

	Lymph-adenitis	Tenderness in Region of		Weak Rings	Arterial Thickening	
		Liver or Gall Bladder	Appendix		Slight	Moderate Marked
20 per cent or more under	3.8	2.0	5.3	4.9	12.7	4.2
Total group	2.7	1.2	3.0	4.1	9.9	3.0
30–39 per cent over	1.5	1.0	2.5	2.2	7.4	1.8
40 per cent and more over	1.1	.9	1.4	1.4	7.2	1.3

[1]Based on Life Extension Institute examinations of policy holders in the "field."

Impairments with Highest Ratios of Rates in "Head" to those in "Field"	Ratio	Impairments with Lowest Ratios of Rates in "Head" to those in "Field"	Ratio
Hypertrophic rhinitis	274	Enlargement or hardening of liver	52
Arterial thickening	265	Tenderness in region gall bladder	60
Weak inguinal rings	261	Neuralgia, neuritis	70
Deflected septum	253	Practically total deafness	78
Slightly infected gums	242	Tenderness in region of appendix	78
Emphysema	238	Asthma	85
Enlarged and diseased tonsils	235		
Perforation of septum	220		
Atrophic rhinitis	216		
Nervousness with increased reflexes	205		
Diseases of external eye or lid	182		
Varicose veins	178		
Exaggerated reflexes	178		
Wax in ears	176		
Positive Romberg test	174		
Prostate, enlarged, tender	173		
Perforation of eardrum	164		

[1]Based on Life Extension Institute examinations of policy holders.

Table 4. Relative influence of the more thorough character of "head" office examinations of white males.[1]

avoidable that there is little reality in such a relation—the rates are higher because the conditions are easier to find. The individual examiner probably has confidence that he can make such determinations independent of disturbing factors; but the statistics indicate that he cannot.

An interesting check on what impairments may be especially affected by changes in the thoroughness of medical examinations is furnished by the classification of the Life Extension Institute data according to whether the examination was made in the "head" offices (mostly New York City) or in the "field." The rates are not consistently higher for each impairment under the more favorable examination

conditions of the "head" offices; on the contrary, for some diseases and defects they are actually lower. Table 4 lists a few of the impairments at each extreme—i.e., where the ratio of "head" to "field" is extremely high, and where it is low.

It is usually felt that an adequate protection against variations in the standards and technique of examiners may be had by continuing the same group throughout a study; and doubtless an individual examiner feels able to go on month after month with the same point of view and with no change in the strictness or liberality of his standards. However, a gradual, imperceptible change is continually taking place, as statistical analysis will show. For instance, in the course of an investigation of lead poisoning, routine examinations of the blood of workers were made. Early in the study a reliable physician found 38 per cent with anisocytosis; six months later, 62 per cent. Corresponding figures for poikiolocytosis were, 22 per cent and 10 per cent; for achromasia, 12 per cent and 69 per cent; for platelets, 54 per cent and 72 per cent. These results are not a reflection on the training of this man, but are quite characteristic of those obtained in many other series of examinations which do not have an objective, quantitative method of measurement. There are many other phases of the medical examination that offer insurmountable obstacles in the way of truly scientific determinations.

III

If these points be true, if indeed the results of physical examinations do fail as an absolute measure of the health of the public and especially, therefore, as any possible indication of changes in the health status, what statistical value do they have to offer us? They have a great deal, as

any careful consideration of the material available will show. The reason lies in one interesting statistical principle: the absolute values may have no true meaning, and yet variations within a group may have a definite, though *relative*, significance. Thus it is possible to show the age incidence of deaths from a particular disease, even though that disease is very poorly diagnosed. It is desirable at this time, utilizing the records of medical examinations made by the Life Extension Institute, to show what some of these relative or indirect comparisons have to offer us.

More than one hundred thousand of such examinations have been analyzed by the research staff of the Milbank Memorial Fund. Previous issues of the *Quarterly Bulletin*, as well as a series of papers in other magazines,[5] have presented the results of these analyses; but it seems desirable to touch upon some of the outstanding features in order to furnish the reader with a convenient summary of what has been accomplished. It will be necessary to select some of the more interesting phases, and refer the reader to the original publications for the actual data; these few phases, however, will be sufficient to bring out the fact that the statistical record of physical impairments, although it must fail as an absolute indication of the health status of the population, still is of great value in connection with various internal comparisons. No detailed comment as regards the points brought out seems necessary.

The examinations of the Life Extension Institute are of various kinds, some being more detailed than others. The records utilized by us have been primarily examinations of life insurance policy holders at "head" offices (chiefly New York) and in the "field." These examinations should not be confused with those of applicants for insurance; they

[5]See list at end of this paper.

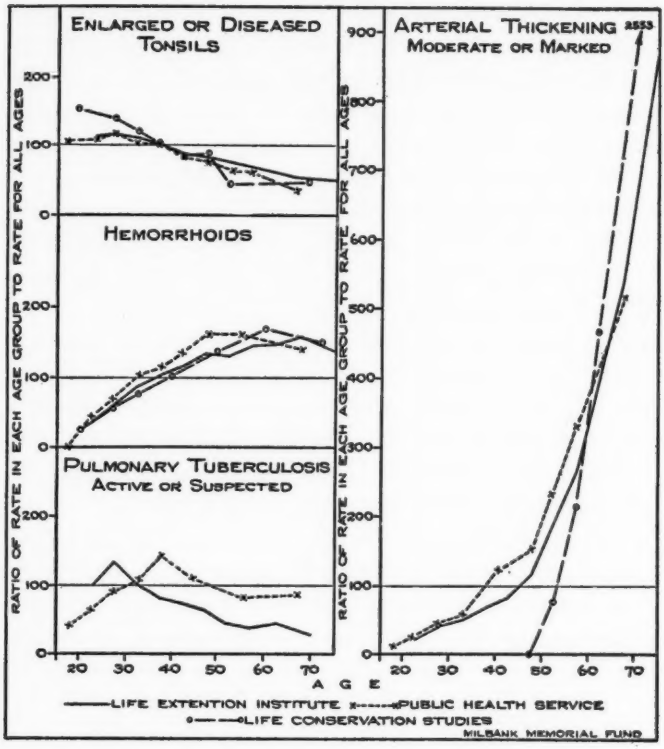

ENLARGED OR DISEASED TONSILS
HEMORRHOIDS
PULMONARY TUBERCULOSIS ACTIVE OR SUSPECTED
ARTERIAL THICKENING MODERATE OR MARKED
RATIO OF RATE IN EACH AGE GROUP TO RATE FOR ALL AGES
AGE
LIFE EXTENTION INSTITUTE
PUBLIC HEALTH SERVICE
LIFE CONSERVATION STUDIES
MILBANK MEMORIAL FUND

Fig. 2. Relative age curves of certain conditions, as determined in three investigations.

are made after insurance has been granted and while the policy is in force. Thus an important selective element is present. There is a preponderance of the more intelligent and better educated, and also the group as a whole is in fairly good health—able to be about. On the other hand, many persons come for examination because they think that their health is impaired. Thus it is not possible to state how representative the group is with respect to the total

population. However, since our interest lies primarily in internal comparisons, this is by no means as serious a difficulty as would at first appear.

Age. The age incidence of specific impairments was given in detail in a special paper and was also summarized in the *Quarterly Bulletin*. For our present purpose, there are exhibited a few significant age graphs (Fig. 2), together with corresponding graphs from analyses of examinations made by the Public Health Service and the Heart Council of Cincinnati. The ratio of the rate in each age to that in all ages is employed, because of the insistence which we desire to place upon the meaninglessness of the absolute percentages.

Table 5. List of diseases in the order of their relative increase or decrease with age.[1]

Marked Decrease	Marked Increase
Enlarged thyroid—simple goiter	Emphysema
Lymphadenitis	Prostate enlarged, tender
Tuberculosis—suspected or actual	High blood pressure (20 mm. or more above average for age)
Frequent colds	Arterial thickening
Chronic skin affections	Enlarged heart
Enlarged, diseased, cryptic, or buried tonsils	Hernia
Hypertrophic rhinitis	Defective hearing
Nasopharyngitis	Organic valvular heart lesions
	Frequent or painful urination
	Functional murmur or irregularity
	Defective vision
	Sluggish, absent, or unequal reflexes
	Varicose veins
	Casts in urine
	Albuminuria
	Bronchitis
	Pyorrhea
	Hemorrhoids
	Carious teeth

[1]Based on Life Extension Institute examinations of policy holders in the "field."

Conditions prevalent among the young are replaced in old age by a different type, having to do with the gradual breakdown of the body. In Table 5 is given a list of those diseases which show a marked decrease with age against those which show a marked increase. In order to obtain this list the rates for five-year age groups were averaged for three broad age groups: (1) 20–34; (2) 35–49; (3) 50 and over. Then the ratios of the first and third age groups to the intermediate age groups were calculated for each impairment. Only conditions with the most striking ratios are listed.

Sex. A study of the relative incidence of physical impairments in the two sexes brought out very marked differences, and in particular failed to show more favorable rates among

Table 6. List of impairments which are much more frequent in women than in men.[1]

	Ratio of Women's Rates to those of Men	Rates	
		Men	Women
Enlarged thyroid—simple goiter	1,362	.69	9.4
Hypothyroidism	938	.16	1.5
Dysfunction of thyroid—toxic goiter	800	.08	.64
Visceroptosis	470	.66	3.1
Edema	442	.43	1.9
Tenderness in region of gall bladder	367	.60	2.2
Adenitis	309	4.4	13.6
Varicose veins	275	7.1	19.5
Organic valvular heart lesions	269	2.9	7.8
Suspected tuberculosis	250	1.2	3.0
Low specific gravity (less than 1.010)	243	5.1	12.4
Functional murmur or irregularity	238	7.2	17.1
Hemorrhoids	187	13.3	24.9
Frequent or painful urination	179	8.2	14.7
Tenderness in region of appendix	171	2.4	4.1
Enlargement of heart	156	2.3	3.6
Nervousness	151	7.6	11.5
Habitual use of laxatives	144	24.8	35.6
Constipation	138	34.6	47.8

[1]Based on Life Extension Institute examinations of policy holders at its "head" offices.

	Ratio of Women's Rates to those of Men	Rates	
		Men	Women
Casts—granular	30	9.8	2.9
hyaline	33	12.0	4.0
Deflected septum—marked	53	12.3	6.5
Arterial thickening—moderate, marked	61	3.8	2.3
Defective hearing	74	14.8	11.0
High specific gravity (1.030+)	76	3.4	2.6
Frequent colds	82	17.2	14.1
Slightly infected gums	86	25.9	22.2
Hypertrophic rhinitis	89	54.8	49.0

[1]Based on Life Extension Institute examinations of policy holders at its "head" offices.

Table 7. List of impairments which are much more frequent in men than in women.[1]

women and was therefore at variance with mortality records. A few of the more important relations are shown in Tables 6 and 7. Owing to difficulties as to the comparability of physical examinations of men and women, attention is centered on those cases where the disparity is too great to be explained on any such basis. The comparison is limited to the "head" office, where facilities were available for equally thorough examinations of women. It may be remarked that the age distribution of men and women examined was quite similar.

Occupation. Analyses were made with respect to the occupations of the persons given physical examinations. There was an admitted selection of great importance, since the only persons included were those who carried life insurance in the cooperating companies and who chose to avail themselves of the health examinations. In spite of this fact, a relation between impairments and broad occupational classes was established, paralleling that which long has been recognized in mortality statistics. Owing to the inconsistency of calculating rates for combined impairments (*see* p. 231), it is necessary to illustrate this relation by showing

a few typical examples, as in Table 8 and Figure 3. A list of those impairments which are relatively high in the skilled trade group is shown in Table 9.

No generalizations as to the impairment rates in specific occupations are possible, but the following list gives information as to the occupations included in the study, and a very broad indication as to which ones had relatively high rates:

Relatively high: street railway employees, waiters, painters, garment workers, tailors, and butchers.

Relatively low: textile workers, electricians, miners, foundry workers, barbers, machinists, telephone and telegraph operators.

Near average: domestic help, ironworkers, factory workers (light), carpenters, stationary firemen, bricklayers, blacksmiths, printers, metal workers, chauffeurs, cutters (cloth), shoe workers, plumbers, firemen and policemen, woodworkers.

However, with the exception of a few conditions definitely associated with occupational hazards, the impression was gained that the higher rates of the skilled trade group seemed to be the result of various factors associated with social, educational, or economic causes, and to be present, in more or less degree, in every specific occupation studied.

Table 8. Rates for certain impairments in four broad occupational groups.[1]

	Defective Vision Uncorrected	Defective Hearing	Carious Teeth	Enlarged or Diseased Tonsils	Valvular Heart Lesions	Arterial Thickening	Constipation	Weak Rings
Agricultural	15.1	12.3	18.3	20.3	2.1	8.7	27.2	2.1
Professional	17.3	10.0	10.5	26.5	2.5	9.6	32.9	3.9
Business	20.3	10.0	12.3	27.2	2.8	10.0	32.9	4.3
Skilled trade	23.8	12.7	17.3	27.3	3.0	12.5	34.5	4.8

[1]Based on Life Extension Institute examinations of policy holders in the "field."

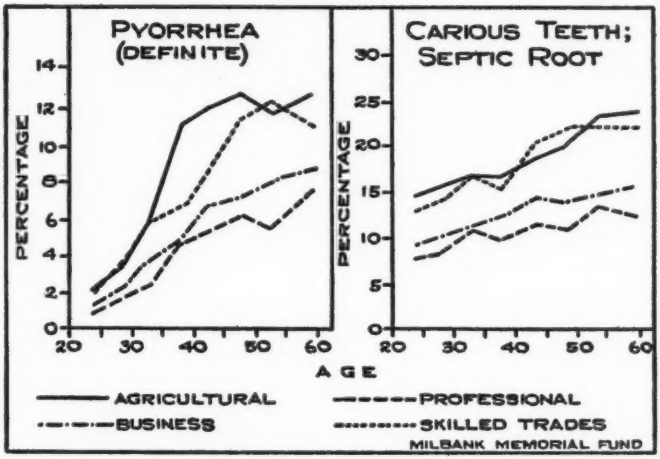


Fig. 3. Age curves of teeth conditions for four broad occupational groups, males; "field."

Weight Status. Since the determination of weight is a part of the customary medical examination, correlations of under and overweight with impairments have proved a fertile field. Certain definite relations exist, which have received due mention in the past. Our purposes must be satisfied by a listing of those conditions which show the most marked relation. As diet is an important factor, information on this point is included. From the list of those impairments which are higher among underweights, we have omitted the conditions previously discussed as being more easy to find among thin persons. (Table 10.)

In view of the purpose of this paper, no reference will be made, except incidentally, to those phases of the medical examination which we may term quantitative. We have in mind particularly blood pressure determinations, pulse rate, Snellen or Jaeger readings for defective vision, hemoglobin, and also the more strictly physical determinations, such as

	Percentage of Occupations with Rates Higher than those of "Business"	Ratio of Rate for all Occupations to that for "Business"
Carious teeth, septic roots	100	147
Pyorrhea (definite)	97	144
Slightly infected gums	93	125
Backache		149
Missing teeth	89	122
Albuminuria—slight		111
Habitual use of laxatives	86	109
Arterial thickening—slight	82	123
Frequent colds		117
Constipation		109
Pus in urine		112
Insomnia	79	130
Abnormal reflexes		112
Defective hearing		118
Dizziness		112
Bronchitis, emphysema		114
Casts, hyaline, in urine		109
Defective vision, uncorrected	75	116

[1]Based on Life Extension Institute examinations of policy holders in the "field."

Table 9. Impairments for which the rates of 75 per cent or more of the occupations were higher than those of the "business" group.[1]

height, weight, chest and abdominal circumference, and chest expansions.

Impairments in Relation to Mortality. Having thus presented a certain amount of information as regards the relative prevalence of physical impairments and diseases among adults, according to age, sex, occupation, and weight status, the question comes to us as to what meaning is to be attached to it all? The data have in their favor the fact that they are supplementary to mortality, morbidity, and clinical records. But, remembering that they were obtained from a particular type of medical survey (the periodic "health" examination), are we to regard the impairments recorded as actually

Markedly Higher Among Overweights	Age Groups	
	30–39	45–64
General dietary excess	1,667	*
Edema	*	200
Hypothyroidism	*	179
High blood pressure (20 mms. or more above average)	647	264
High specific gravity (1.030 and more)	125	307
Flat feet	158	243
Rapid eating	193	197
Use of alcohol	215	135
Tonsillitis (history)	109	215
Miscellaneous dietary errors	142	156
Hernia	162	124
Rheumatism or gout	130	137
Enlarged or diseased tonsils	132	124
Markedly Higher Among Underweights		
Anemia (below 75 per cent hemoglobin)	0	14
Tuberculosis, pulmonary, actual or suspected	6	3
Spinal curvature	29	17
Low blood pressure (15 mms. or more below average)	24	23
Recent loss of weight	29	34
Pathological signs in lungs (not suspicious of tuberculosis)	24	40
Faulty posture	27	38
Neurasthenia	31	36
Low specific gravity (less than 1.010)	52	23
Organic valvular heart disease	24	58
Nervousness	38	44
Visceroptosis	34	58
Varicocele	42	56
Gastric disturbances	56	42
Constipation	60	63
Recent influenza	54	71
Too little water consumed	63	71
Vitamine deficient diet	70	70
Functional heart murmur	59	83
Frequent colds	71	76
Nasopharyngitis	74	73
Habitual use of laxatives	81	78

[1]Based on Life Extension Institute examinations of policy holders in the "field."
*No cases in underweight group.

Table 10. Ratio of the rate among persons who were 30 per cent or more over average weight (for height and age) to those 20 per cent or more below, for specific impairments.[1]

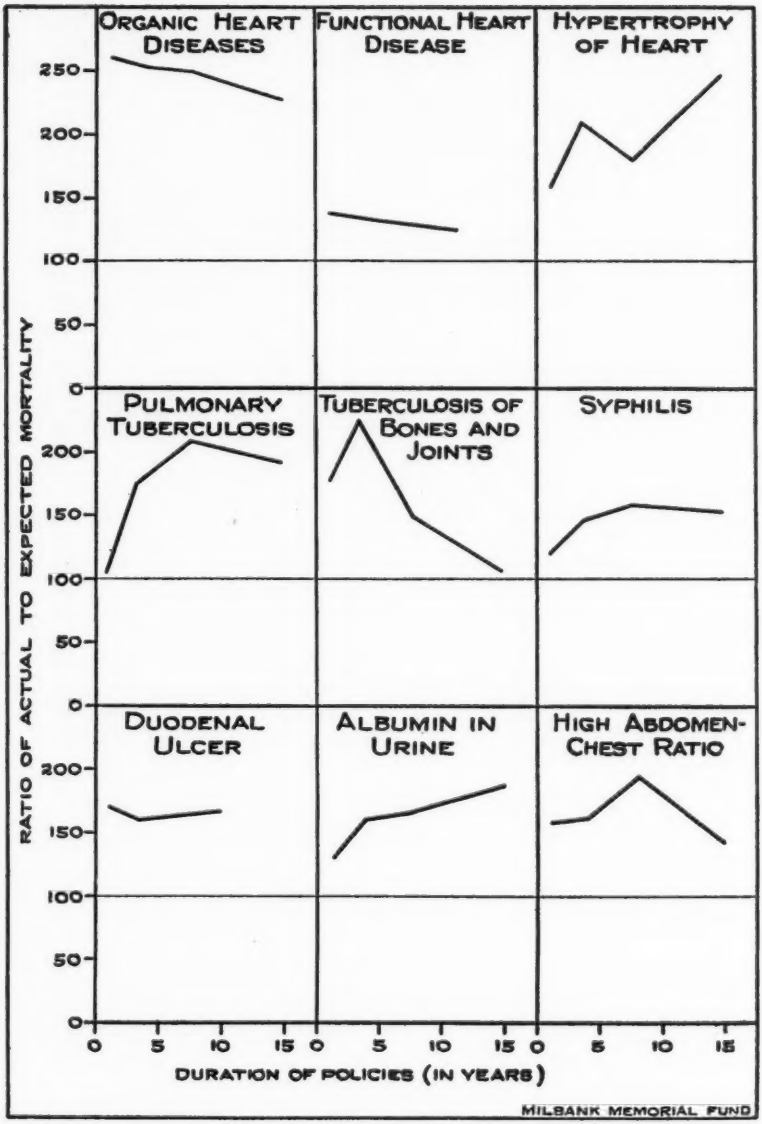


Fig. 4. Duration of high rates of mortality among persons found to have certain impairments on examination for life insurance.

serious in their effect or merely trivial? In the absence of any measure of physical suffering, such a question must be answered in terms of a possible shortening of life; that is, a higher mortality rate than expected. Interesting light on this point has been furnished by a recent publication[6] covering the excess mortality among insurance policy holders who had certain impairments at the time of taking out life insurance. The expected mortality was determined by taking into account numbers exposed at various ages and after different durations of the policies, and then the ratio of the actual to the expected number of deaths was calculated. It was found that many conditions, although they did not at the time prevent the individual from being insured (perhaps at a higher rate of premium), resulted in excess mortality; that this mortality for a number of conditions continued for many years of policy life; and that the impairments were associated with extremely high excess mortality from a few specific causes. It is not possible to present this material here in any detail, but Figure 4 is added as a striking example of the persistency with which high rates of mortality continue among persons found to have certain impairments on application for insurance.

IV

The conclusion to which we come is inevitable. The statistical data derived from medical examinations cannot be taken as an *absolute* measure of the health of the population. The percentage of persons found to have any specific impairment becomes, in the light of the principles set forth, a nebulous thing. We must turn the direction of our interest from such absolute figures to the *relative* comparisons; but in these we will find a real reward. Many facts of definite

[6]Medical Impairment Study, 1929. Compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors.

importance to the public health worker will be found in relative comparisons as to the rate of medical impairment in different population groups, whether separations are made by age, by sex, by occupation, by weight status, or by numerous other divisions which may be of especial interest in a particular investigation.

STUDIES IN THE DISEASES OF ADULT LIFE FROM THE DIVISION OF RESEARCH, MILBANK MEMORIAL FUND

1. Sydenstricker, Edgar, and Britten, Rollo H.: General Results of a Statistical Study of Medical Examinations by the Life Extension Institute of 100,924 White Male Life Insurance Policy Holders Since 1921. *American Journal of Hygiene*, January, 1930, xi, No. 1, pp. 73–135.

2. Sydenstricker, Edgar, and Britten, Rollo H.: Prevalence at Different Ages, Based on Medical Examinations by the Life Extension Institute of 100,924 White Male Life Insurance Holders Since 1921. *American Journal of Hygiene*, January, 1930, xi, No. 1, pp. 73–135.

3. Wiehl, Dorothy G.: Some Recent Changes in the Mortality Among Adults. *Journal of Preventive Medicine*, May, 1930, iv, No. 3.

4. Sydenstricker, Edgar, and Britten, Rollo H.: Physical Impairments and Occupational Class. Differential Rates Based upon Medical Examinations of 100,924 Native-Born Adult White Insured Males. *Public Health Reports*, August 22, 1930, xlv, No. 34, Reprint No. 1404.

5. Brundage, Dean K.: Incidence of Illness Among Wage-Earning Adults. *Journal of Industrial Hygiene*, November and December, 1930, xii, pp. 338–358; 381–400.

6. Britten, Rollo H., and Goddard, Jennie C.: Rates of Physical Impairments in 28 Occupations, Based on 17,294 Medical Examinations. *Public Health Reports*, January 1, 1932, xlvii, No. 1.

7. Britten, Rollo H.: Sex Differences in the Physical Impairments of Adult Life. A Comparison of Rates Among Men and Women, Based on 112,618 Medical Examinations by the Life Extension Institute. *American Journal of Hygiene*, May, 1931, xiii, No. 3, pp. 741–770.

NEWS DIGEST

⊙⊙⊙ *Newsholme's "Medicine and the State" Attracts Wide Attention*

Sir Arthur Newsholme, who had planned to visit the United States during May, and was scheduled to deliver addresses at the annual meeting of the American Medical Association, and at the New York Academy of Medicine, was forced to cancel his trip because of the illness of Lady Newsholme.

His latest book, "Medicine and the State," was published on May 9 simultaneously in England and the United States. This volume, as has been announced in the *Bulletin*, presents the author's personal interpretation of and conclusions from the factual matter assembled in his three volumes, "International Studies on the Relation Between the Private and Official Practice of Medicine with Special Reference to the Prevention of Disease."

Sir Arthur's comprehensive definition of "state medicine" includes "official practice" whether supported by taxation or voluntary contributions. Hospitals and clinics, sickness insurance schemes, public health measures, school hygiene, and facilities for the care of paupers and the insane, are all discussed in relation to private practice. The author holds that the unit both in curative and preventive medicine should be the family. In his opinion the family doctor is "the most important single agent in medical work." However, he sees an increasing need for "group practice" by physicians in order to provide better care for patients. He maintains that the doctor should be "the family adviser of the well and not only of the sick," but he goes on to say that private preventive medicine calls for a radical change in methods of remuneration.

On the curative side, Sir

Arthur declares that "for a large share of the population the individual cost of sickness is overwhelmingly great." He maintains that for certain wage-levels it is necessary to inaugurate sickness insurance with contributions jointly from employers and employees. Although voluntary insurance is successful in some countries, notably in Denmark, he believes that compulsory schemes may also be justified. Sickness insurance can become "a valuable instrument in preventive medicine," he asserts.

"Medicine and the State" has already attracted wide attention. Professor Lewellys F. Barker, M.D., of the Johns Hopkins University, says, "I think this volume will have a very important influence upon the thought of medical men regarding the organization of medical services in this country." Professor Walton H. Hamilton, of the Yale University School of Law, calls the book "a worthy supplement to the other volumes and an excellent perspective of the problems with which they are immediately concerned." Dr. F. Humbert, formerly director of the Health Division of the League of Red Cross Societies in Paris, says that this volume "crystallizes the situation in such a clear manner" that he hopes it will be read by all medical practitioners. Sir John Collie, Chief Medical Officer, Metropolitan Water Board, London, predicts that the book "will stand out as a milestone for generations."

The press is also alert to the great significance of this volume. Thus the Boston *Transcript* devotes several columns to a presentation of the author's main conclusions. Editorial comment has already appeared in many American dailies. The British press, as was to be expected, is devoting much space to the book.

The Journal of the American Medical Association has published a special article by Sir Arthur which is based on "Medicine and the State" and the three volumes in the "International Studies." Commenting on this article and on the volumes under discussion, the *Baltimore Health News* says that Sir Arthur's "American friends will recognize in these latest contributions much of the personal charm and vigor of the veteran health administrator. The fact that the summary article has been placed on the desk of every up-to-date physician

in the United States is of great significance. There can be no more vital problem confronting the medical profession than that under discussion by this eminent author."

"Medicine and the State," containing 308 pages, is published by The Williams and Wilkins Company, Baltimore, and George Allen and Unwin, London. The volume sells at $3.50 or 7/6.

⊛ ⊛ ⊛ *Physical Impairments in Relation to Occupation*

In a recent one of the series of Studies in Diseases of Adult Life[1] it was found that broad occupational or socio-economic groups of male white life insurance policy holders given health examinations by the Life Extension Institute showed marked differences in the rates of certain physical impairments. Of all the groups the one which showed the highest rates in general was the group designated as "skilled trades." The examination records for this group of 17,294 persons, furnished by the Life Extension Institute, were further analyzed in order to discover whether or not any specific kinds of impairments were associated with any specific occupations. The results of this further study which was carried out in cooperation with the Office of Industrial Hygiene and Sanitation of the United States Public Health Service, were presented in a paper by senior statistician Rollo H. Britten and junior statistician Jennie C. Goddard of the Service, published in the United States *Public Health Reports* of January 1, 1932, xlvii, No., 1 as No. 6 in the Milbank Memorial Fund's Studies in Diseases of Adult Life.

Occupation *per se* appeared to be associated with only a few specific impairments. Thus, defective vision was clearly associated with garment work, cutting, and tailoring. For defective hearing, the very interesting result was found that the occupations showing the highest impairment rates are those in which noise is a definite condition. For carious teeth and pyorrhea, painters have the highest rate, a fact possibly associated with lead poisoning.

The most interesting and significant finding of this study was

[1]Sydenstricker, Edgar, and Britten, Rollo H.: Studies in Diseases of Adult Life No. 4, Physical Impairments and Occupational Class. *Public Health Reports*, xlv, No. 34, August 22, 1930.

"that the higher rates characteristic of the industrial workers were not to be explained, except in a few instances, as being due to the hazard of any specific occupation. On the contrary, these higher rates seemed to be the result of various factors associated with social, educational, or economic causes, and to be present, in more or less degree, in every specific occupation studied. Differences among the industrial occupations did not appear to be of great moment, and when found seemed to reflect either selection (the tendency of workers with certain impairments to drift into occupations where such impairments would not serve as a handicap) or the presence within the industrial occupations themselves of social or economic differences."

◎◎ *Change in the Size of Families between 1870 and 1910*

An unique approach to the study of trends in the fertility of certain social classes prior to 1910 was presented to the Division on Social Biology and Population of the American Sociological Society at its meeting in December. The paper, written by Xarifa Sallume and Frank W. Notestein of the Fund's Division of Research, is a further analysis of data for selected native-white populations obtained by a special tabulation of samples of the 1910 census data relating to the number of children ever born to each married woman, the wife's age, and the husband's occupation.

These data make it possible to determine the number of children ever born per one hundred women, for women whose ages in 1910 ranged from forty-five to eighty-five years, and whose childbearing periods, therefore, ended as recently as 1910 and as early as 1870. The trends in such cumulative birth rates can be said to measure time changes in fertility only on the assumption that there is no association between fertility and the length of life after the end of the childbearing period. At present the evidence on this point is fragmentary, but it appears unlikely that the trends observed could be accounted for by such an association if it exists, and probable that they reflect, if they do not measure, actual time changes in fertility.

The analysis of the data leads to the following conclusions. (1) In each social class considered, the size of completed families

was declining through the entire period covered by this study, which is from 1885 to 1910 for the professional, business, and skilled-worker classes of the urban population, and from 1870 to 1910 for the farm-owner class. (2) These changes in the size of completed families must reflect the falling annual birth rates of a still earlier period. (3) Fertility appears to have declined more rapidly in the urban classes than among the wives of farm owners, and somewhat more rapidly in the "upper" urban classes than in the "lower." (4) These differences in the rate of decline have brought about increased differences in the fertility of the social classes considered.

Aside from the social significance of these results to those who are taking stock of the changes in our population, the facts brought out by this study are of practical importance to those who are interested in public health and social welfare. For they indicate the manner in which the population has been recruited from the various social classes as well as the changes in the size of the family in different social classes, and they point rather definitely to the conclusion that other factors than birth control have long been operating to reduce the rate at which the American people on different social levels are reproducing themselves. By inquiries such as these, information will be secured that will enable the public health statesmen to judge of the type of population the size of the family that health activities will deal with in the future. A new field is opened also for sociologists, biologists, and physicians to inquire into the physiologic and social factors affecting fertility and sterility and to see how these factors can be dealt with for further promotion of health and economic welfare.

The complete paper will appear in the *Proceedings of the American Sociological Society, 1931.*

⊛⊛⊛ *Study of Public Health Methods in Two Virginia Counties*

THE Milbank Memorial Fund is cooperating with the United States Public Health Service in a qualitative and quantitative study of public health administration and methods in the two counties of Greenville and Brunswick, Virginia. Edgar Sydenstricker, di-

rector of the Fund's Division of Research, who is also principal statistician in the United States Public Health Service in an advisory capacity, was requested to assist in preparing the plans for this study, and Miss Marian G. Randall and Miss Dorothy G. Wiehl of the Fund's staff have also been assisting in the inauguration of special phases of the study.

This is the first of a series of studies to be undertaken by the Office of Studies of Public Health Methods of which Surgeon Joseph W. Mountin is in charge. The public health activities in these two counties are under the administration of one full-time health officer, and his staff consists of two public health nurses, one sanitary inspector, and a clerk. The two counties have a total population of approximately 30,000, and thus offer a wide contrast in public health facilities and procedures to those developed in Cattaraugus County, New York. By reason of the Fund's cooperation and assistance, the studies of the various health activities in Greenville and Brunswick Counties, Virginia, will be comparable in many respects to those being made in Cattaraugus County.

● ● ● *American Institute of Architects Calls for Revision of Ventilation Laws*

In line with the conclusions of the New York Commission on Ventilation, which was financed by the Milbank Memorial Fund, are the resolutions of the Executive Committee of the American Institute of Architects, adopted in February, this year, and published in the March issue of *The Octagon*, the Institute's journal. In connection with these resolutions readers of the *Bulletin* are referred to "School Ventilation, Principles and Practices," published in 1931 by Teachers College, Columbia University, New York, this being the final report of the Commission. This report was reviewed in some detail in the January number of the *Quarterly Bulletin*.

The resolutions of the Executive Committee of the American Institute of Architects are as follows:

Whereas, Present laws and regulations relating to the ventilation of buildings require a tremendous annual expenditure for ventilating equipment involving the health, welfare, and comfort of the general public, and

Whereas, The prevailing standards of practice in the ventilation of build-

ings are not supported by proven scientific facts, and

Whereas, Competent hygienists and medical authorities, on the basis of authentic physiological data from reliable sources, are not in agreement with heating and ventilating engineers, and

Whereas, This chaotic condition has created a widespread dissatisfaction in the public mind regarding methods of ventilation, resulting in many objections to the present engineering practice, now therefore be it

Resolved, That the American Institute of Architects recommends the revision or repeal of present codes and regulations relating to the ventilation of buildings, wherever such codes and regulations are not supported by rational and authentic physiological data acceptable to both the hygienist and the engineer, and be it further

Resolved, That the American Institute of Architects is opposed to the promulgation or adoption of further codes, requirements, regulations, or standards for ventilation until such time as an agreement between recognized authorities in the medical and engineering professions has been reached regarding the necessary minimum standards for ventilation, and be it further

Resolved, That the American Institute of Architects favors the creation of a national movement to determine the factors to be considered in maintaining the health, comfort, and safety of the occupants of buildings as affected by ventilation and that these factors, when determined, shall be used as the basis for a ventilating code of fundamental minimum standards generally applicable in all communities, and be it further

Resolved, That the Secretary be instructed to send a copy of this resolution to the Board of Directors of the American Society of Heating and Ventilating Engineers, the American Standards Association, the American Public Health Association, the United States Public Health Service, the American Medical Association, the Ohio State Association of Architects, and the Secretaries of all Chapters of the Institute, and that a copy of this resolution be printed in *The Octagon.*

◎ ◎ ◎ *New Health Center Construction in Serbia*

FOURTEEN health center buildings have recently been completed and seven more are under construction in Serbia as a result of work started by the Serbian Child Welfare Association, to which the Milbank Memorial Fund made a grant in 1919. One of the new buildings is to be called the Elizabeth Milbank Anderson Health Home, according to a recent report. Seventy-eight health centers in all have been established.

An early activity of the Association was the establishment of the Training School for Nurses, in Belgrade, the first of its kind in this part of the Balkans. There are now four such training schools.

• • • *First Heart Clinic in Syracuse*

THE first heart clinic in Syracuse, New York, and one of the first in American cities in the same population class, was started this year in March by the Onondaga Health Association. The plans for this clinic, which is held at the Syracuse Free Dispensary, were developed by a committee of doctors and laymen headed by Dr. E. C. Reifenstein, professor of medicine in Syracuse University. Dr. Reifenstein is also the chief of staff for the heart clinic. He is assisted by ten internists and pediatricians. Other physicians from the Medical College and on the Dispensary staff will make fluoroscopic and X-ray studies and have charge of laboratory procedure. The Milbank Memorial Fund has contributed an electrocardiograph, a basal metabolism apparatus, and other equipment to the heart clinic. Miss Eleanor L. Dodge, who has had medical social service experience in Chicago, St. Louis, and Philadelphia, is executive secretary of the committee. It is affiliated with the American Heart Association.